

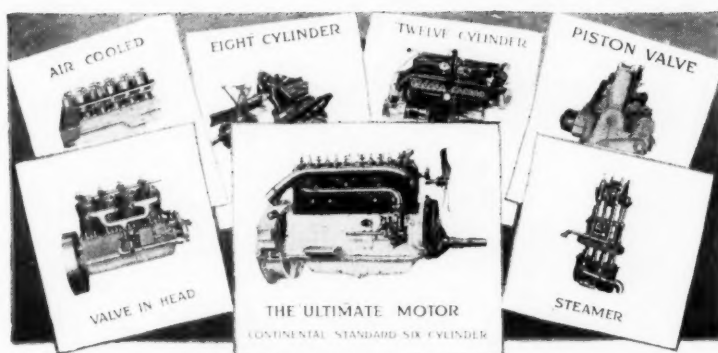
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# The AUTOMOBILE

Vol. XXXVI  
No. 6

NEW YORK, FEBRUARY 8, 1917

Ten cents a copy  
Three dollars a year

*Motors vary in number of cylinders, in design, in construction. But there is only one that is recognized as standard—the Continental.*

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SPEEDOMETER CORPORATION  
CHICAGO, U. S. A.**



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Stewart  
Tire Pump



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Stewart  
Speedometer



\$6

Motor Driven  
Warning Signals



\$1

Stewart V-Ray  
Spark Plug



\$50

Warner  
Auto-Meter



# The AUTOMOBILE

VOL. XXXVI

NEW YORK—THURSDAY, FEBRUARY 8, 1917—CHICAGO

No. 6

## To Build Sunbeam Engines in U. S.

**Sterling Co. Secures Manufacturing Rights—Twelve-Cylinder Out Next Sept.**

BUFFALO, N. Y., Feb. 2—The Sterling Engine Co., this city, has secured the manufacturing rights for the production in America of Sunbeam engines. That this company had in its possession one of the latest twelve-cylinder Sunbeam aviation engines was a current rumor 3 months ago. The truth of this report is now confirmed. The company hopes to have an American-made Sunbeam twelve-cylinder aeroplane engine running about September of this year.

Considerable difficulty, it is stated, was experienced in obtaining permission from the British Admiralty for the export of particulars regarding the Sunbeam products, but this was eventually overcome.

### 5,000 Jordans for 1917

CLEVELAND, Feb. 7—The Jordan Motor Car Co., this city, will turn out 5,000 cars in 1917. President E. S. Jordan, in a report at the annual meeting, stated that between beginning of production in August and Jan. 1, more than \$1,000,000 worth of materials were used and paid for. A production of ten complete cars per day is the present output. The same officers and directors were elected for the coming year.

### Engineers Agree on One Grade of Fuel

DETROIT, Feb. 7—Automobile engineers and oil company representatives met here today and agreed on a gasoline ordinance. The ordinance proposed calls for one grade of fuel which will show a total of 20 deg. boiling at 220 deg. Fahr. The fuel can either be distillate or cracked. The experts from the oil companies wanted 16 per cent boiling at 212 deg. claiming it better for warm weather,

but the automobile engineers refused, stated it unsatisfactory for winter and the 20 deg. was named instead.

Those in attendance at the meeting were Inspector J. C. McCabe, Municipal Safety Engineering Dept.; C. C. Hinkley, chief engineer of the Chalmers company; W. O. Thomas, consulting engineer; A. R. Miller, E. D. Johnson of the Indiana Standard Oil Co.; J. Ratn, Rath Oil Co.; K. W. Zimmerschied, chief metallurgist of the General Motors Co.; Russell Huff, chief engineer of the Dodge company; G. Holley, of the Holley Bros. Co.; D. McCall White, chief engineer of the Cadillac company; J. G. Vincent, vice-president of the Packard company; Guido Behn, chief engineer of the Hudson company, and R. L. Francis, of the Central Oil Co.

### U. S. Standard Screw Thread Tolerances Invoke S. A. E. Aid

WASHINGTON, D. C., Feb. 6—On Jan. 10 a bill was introduced in Congress by Mr. Tilson to provide for the appointment of a commission to standardize screw thread tolerances, so that the War Department and other government departments which purchase machinery would make the same demands in this respect. The suggestion is that the commission shall contain government representatives from different departments and appointees of the American Society of Mechanical Engineers.

### To Consult Manufacturers

A hearing took place yesterday for the purpose of a discussion of this bill and among those invited to attend was the Society of Automotive Engineers, in order that information could be given regarding the S. A. E. fine pitch threads established in 1906. It appears that in the formation of the suggested standards makers of taps and screws will be consulted as well as users, and it is the belief of Dr. Stratton, director of the Bureau of Standards, that it will be possible for the industry and the government department to agree upon a practice which both can follow.

## S. A. E. Council Plans for 1917

**Approves Entire Draft of Standards Committee—No Boat Trip This Year**

CHICAGO, ILL., Feb. 1—The regular January meeting of the Council of the Society of Automobile Engineers was held this afternoon at the Chicago Automobile Club, the session partaking largely of organization work for the present year. The entire draft of the Standards Committee was approved by the Council, and Chairman John G. Utz has now his organization complete and decks cleared for 1917 standards work.

The Council voted unanimously not to take a boat trip during the mid-summer meeting as has been the custom for the past 2 years. This is largely due to the fact that the activities of the society have been very materially broadened because of consolidation with such other engineering bodies as aviation, tractors, and marine motoring. The capacity of the largest available lake steamers suitable for summer sessions was reached last year, and it was impossible to secure adequate accommodation for the enlarged society on any boat. It has not been definitely settled where the summer session will be held, but the 1917 meetings committee has the matter in hand and hopes to make some definite announcement in the near future.

### Winter Meeting in Chicago?

There has been some talk around the automobile show this week along the line of holding the winter meeting of the society next year in Chicago. Each year sees Chicago's great business show increasing in this field and the representation of the industry is generally greater at Chicago than at New York. The suggestion that the S. A. E. hold its dinner and winter meeting in this city has met with generally favorable re-

(Continued on page 322)

## Fiat Co. To Build Small Car

Will Sell at About \$2,000 and Will Be Announced When Peace Is Declared

NEW YORK, Feb. 3—The F. I. A. T. Co., Poughkeepsie, N. Y., will invade the medium-priced automobile field as soon as peace is declared, according to J. S. Josephs, of the American company, who arrived here Feb. 1 after a trip to the factory of the parent Fiat company in Turin. As soon as the war is over, the Fiat company will enlarge its Poughkeepsie plant to nearly ten times its present size and will produce on a large scale a car selling around \$2,000. The arrangements for building a medium-priced car will not mean the discontinuing of the higher-priced models.

Mr. Josephs, who was formerly treasurer of the company, is now in charge of American manufacturing and sales. The Italian company recently acquired control of the American factory, buying all of the stock of the Poughkeepsie factory except that held by Mr. Josephs.

The factory in Turin now employs 17,000 men and is turning out 2000 motor vehicles a month. It also has a monthly output of sixty aeroplanes. The Poughkeepsie plant, it is stated, will probably put an aeroplane engine on the market.

Mr. Josephs declared there is no possibility of the Fiat company shipping two of its racing cars to the United States on account of conditions in Italy, where all of the automobile production is under government control. A special permit must be obtained from the Rome authorities who are usually reluctant in such matters on account of the need of automobiles in the army at the present time.

The Italian factory has been enormously increased since the outbreak of hostilities. On two occasions the capital has been increased, until it now stands at 29,750,000 lire, roughly \$5,900,000. A new four-story factory is now being constructed. A chassis test track is being built on the roof. This factory, it is stated, will alone be able to produce 20,000 complete cars a year.

### Velie to Advance Prices \$50 on Open Cars

NEW YORK, Feb. 2—The Velie Motor Vehicle Co. will advance its prices \$50 on March 1 on all its open cars. On that date the following prices will prevail: Model 28, five-passenger touring, \$1,185; with detachable sedan top, \$1,385; four-passenger companionable roadster, \$1,185; two-passenger roadster, \$1,165.

Model 27, seven-passenger six, will sell for \$1,650.

The closed body types are the four-passenger coupe at \$1,750, the touring sedan at \$1,685, and the town car at \$2,250.

### Acme Truck Prices Advanced

CADILLAC, MICH., Feb. 6—Prices of Acme trucks produced by the Cadillac Auto Truck Co. have been advanced, effective Feb. 15. The new prices are: One-ton, \$1,575 instead of \$1,500; 2-ton, \$2,200 instead of \$2,100; 3-ton, \$3,000 instead of \$2,900. All orders booked prior to Feb. 15 with deposits will be subject to the old prices.

### N. A. C. C. Forms Export Department

DETROIT, Feb. 5—The National Automobile Chamber of Commerce recently voted to form an export department for the benefit of its 101 members. Exports for 1916 were about \$96,000,000, or 10 per cent of the entire motor car production.

### Hayden Resigns from Pullman

YORK, PA., Feb. 2—H. W. Hayden has severed connections with the Pullman Motor Car Co. and is about to enter into another manufacturing business. Mr. Hayden was formerly general manager. That office has been abolished and in its stead all departments will report to the operating board, consisting of Messrs. Keyworth, Hoff and Schmidt.

### Ford Trucks Ready in April

DETROIT, Feb. 5—It is reported that the Ford Motor Co. will produce a truck and will have it ready to sell by April 1. The reports add that the company has contracted for material for 250,000 of these trucks.

## Simplex Working on New Four

Town Car Chassis to Sell at \$4,000—L-Head Motor

NEW YORK, Feb. 3—The Simplex Automobile Co., New Brunswick, N. J., is working on a new four-cylinder town car, which will be brought out some time next winter. It will have an L-head, 4 by 5-in. motor, cast in block, developing about 35 hp. The chassis will sell for \$4,000. The wheelbase will be 125 in.

Capacity of the plant is now 500 of the sixes a year. The company expects to build about 800 of the fours a year.

The first motors of the Hispano-Suiza type, made by the Wright-Martin Aircraft Corp., in the local Simplex plant, have been most successful. Production of these motors is expected to reach capacity by March 1. The capacity of this plant is now 300 Hispano-Suiza motors per annum.

## To Reconsider N. Y. Truck Fees

Governor May Appoint New Commission to Determine Equitable Rate of Taxation

ALBANY, N. Y., Feb. 6—It is almost certain that Governor Whitman will appoint a new commission to determine a new schedule of fees for motor trucks and omnibuses in New York State to replace those ratified last week and which he signed. This is the result of a hearing before the Governor to-day attended by motor truck interests throughout the State, who pointed out that the Hewitt-Wells bills were unfair because they were railroaded through the Legislature without adequate hearings and because the taxes were based on gross weight of vehicle and load with no consideration of speed, kind of tire, or weight per inch of tire width.

Upon these grounds a strong appeal was made for the repeal of these drastic truck bills. This will not be granted. Truck users will have to pay this year's fees at the new rate unless the commission to be appointed should determine upon its new rate before the end of the year. Then it is possible that a pro-rata share of the 1917 fees may be returned. All 1917 fees should be paid under protest.

It was urged at to-day's meeting that the new highway commission consist of a motor truck engineer, a highway engineer and a State engineer.

### Saxon Production Only Slightly Delayed

DETROIT, Feb. 5—Assembling is already being done in property just leased by the Saxon Motor Car Corp. following the fire at the company's plant last week, where \$500,000 damage occurred, and mill sites are being secured this week in which all production will immediately begin. The company has plenty of material for assembly on hand and as the necessary machinery can be secured at once it will be but a few days when all employees are again at work.

The service department was not damaged and is able to supply repair parts.

The fire, which started in a repair shop and passed from there to the test repair room and further into the factory, destroyed 200 cars.

The company is erecting a large plant on the outskirts of Detroit, and will hasten its completion, which was first planned for June 1 but will now probably be finished within 90 days. In the meantime business will be completely cared for by temporarily rented factory buildings.



## New Co. to Handle Pullman Sales

Capital \$250,000—New Six Ready Soon—\$4,000,000 Business in 1916

YORK, PA., Feb. 6—The Pullman Motor Car Corp. has been formed in Delaware with a capital of \$250,000 for the purpose of marketing the entire output of the Pullman Motor Car Co. The latter company will continue to manufacture Pullman cars, but has turned the entire selling of them over to the newly-formed corporation.

The stock of the new corporation is held by the same interests that control the Pullman Motor Car Co., and the purpose of the selling organization is to assume all of the guarantees, financial obligations connected with the sale of the Pullman product. Existing contracts with all Pullman dealers continue as heretofore, and the new corporation will maintain all of the guarantees on all Pullman cars sold in the past as well as in the future.

During the past year the business of the Pullman Motor Car Co. approximated \$4,000,000, which was done on a capital of \$500,000, which was quite inadequate for such a total of business. Plans are under way for an increase of capital to provide sufficient working funds and for an increase in factory facilities.

Increased finances will be controlled by the present stockholders, who are largely business men of York and eastern Pennsylvania. J. C. Schmidt, formerly chairman of the board of directors, is president of the Smith Ault Paper Co. and director in many public utilities in eastern Pennsylvania. Geo. H. Schmidt, his brother, is a corporation lawyer. Carlton Hoff is production manager of the American Chain Co., York; W. A. Keyworth is president of the First National Bank, York, and J. E. Baker is a large coal and limestone operator in eastern Pennsylvania.

The company will bring out in a few weeks a new six-cylinder model at a very low price, and to be built in quantities.

### Cortex, New Substitute for Asbestos in Facing Disk Clutches

INDIANAPOLIS, Feb. 5—A new material for facing disk clutches is being manufactured by the Hide, Leather & Belting Co. It is a composition containing a quantity of cork and will be sold under the trade name of Cortex. For this material it is claimed that the coefficient of friction is higher than that for asbestos compounds, and that prolonged use does not cause glazing or make the material

hard, and that there is no restriction in the supply of the materials. At the same time the cost is stated to be from one-half to one-third less than that of asbestos. The material is applied in exactly the same way as the ordinary rings for disk clutches, and the company is prepared to make facings interchangeable with asbestos facings for any dry disk clutch.

### Stephens Makes Organization Changes

FREEMONT, ILL., Feb. 3—The Stephens Motor Branch of the Moline Plow Co., this city, has made several changes in the organization. H. C. Dunning has been appointed assistant to General Manager H. J. Leonard, and will take charge of his new post Feb. 15. J. E. Corbielle, formerly with an eastern company, has been appointed superintendent of the automobile department of the Stephens plant, to succeed R. A. Stickney, resigned to take service with an eastern concern. William Stewart has been appointed sales manager in charge of the southern Wisconsin and northern Illinois territory.

### Beijer Officers Re-elected

STEVENS POINT, WIS., Feb. 3—All of the officers of the Beijer Hydraulic Transmission Co., this city, were re-elected at the annual meeting, as follows: President, N. A. Week; vice-president, R. K. McDonald; secretary-treasurer, F. D. Reynolds, and manager, Arthur Beijer. The company has completed the installation of its system in several models of automobiles for demonstration purposes.

## 12,456 Paige Cars in 1916

Co. Has Monthly Turnover Equal to Its Capitalization

DETROIT, Feb. 5—The Paige-Detroit Motor Car Co., in its recent report, showed that it has manufactured 12,456 cars in 1916 up to Nov. 25 as compared with 7749 cars for the year 1915 and 4631 in 1914. The total sales for 1915 were \$7,471,033.37, with a net income available for dividends of \$609,775.87. Total sales for the 10 months ending Oct. 31, 1916, were \$9,899,790.48, with a net income available for dividends of \$964,442.21. It now has a monthly turnover about equal to its capitalization.

In 1911 the authorized capital of the company was increased from \$100,000 to \$250,000, in 1915 to \$500,000, in May, 1916, to \$1,000,000, and again in September, 1916, to \$1,500,000. This latter now has a common stock market value of \$5,887,500. One thousand dollars invested in the Paige company in 1913 would now be worth \$36,988.

## Stewart-Warner Earns \$2,215,042

Surplus of \$2,105,967 Equal to 21 Per Cent on Common—\$638,556 in Dividends

CHICAGO, Feb. 3—The Stewart-Warner Speedometer Corp. for the year ended Dec. 31, 1916, showed net earnings of \$2,215,042. The corporation paid \$638,556 in dividends and the balance amounted to \$1,576,485.

The corporation laid aside \$241,500 in the sinking fund for retiring the preferred stock, making a total of \$1,817,986. In retiring some of the preferred stock last year, the corporation paid over a premium of \$70,690, leaving a balance of \$1,747,296. The property has been revalued at \$358,671, leaving a net surplus of \$2,105,967, equal to about 21 per cent of the \$10,000,000 common stock outstanding.

### 66,000 Hayes Wheels in 1916

ST. JOHNS, MICH., Feb. 5—At the annual meeting of the Hayes Motor Truck Wheel Co. the following officers were elected: President, C. B. Hayes; vice-president and treasurer, N. S. Potter; secretary and general manager, A. D. Smith; vice-president and timber manager, W. C. Morrey; superintendent, H. J. Kellar. These officers, with W. C. Durant, compose the board of directors.

A report of the year's progress showed 66,000 wheels were manufactured, bringing \$260,000. The payroll now covers 145 men. Prospects for 1917 were reported as good, enough orders being on the books to obviate the possibility of a shutdown during the year.

### Government Opens Bids on Caterpillar Tractors

WASHINGTON, Feb. 6—Sealed proposals will be received at the office of the chief signal officer, War Department, this city, until Feb. 20, 1917, for furnishing caterpillar tractors of medium horsepower. The proposal number is 912.

### Weidner Joins Bedford Mfg. Co.

PHILADELPHIA, Feb. 1—George G. Weidner, for the past three years manager of the Stewart-Warner Speedometer Corp.'s local branch, has resigned to become associated with the Bedford Mfg. Co., Mt. Vernon, N. Y.

### Enos Is Torbensen Sales Mgr.

CLEVELAND, Feb. 2—Robert C. Enos has resigned from the American Distributing Co. to become sales manager of the Torbensen Axle Co., this city.

## Chain of Accessory Stores Started

### New Sales Organization, Backed by \$1,000,000, to Operate from Kansas City

NEW YORK, Feb. 6—A huge accessory sales organization, backed already by \$1,000,000, has been started to run a chain system of accessory stores throughout the United States. The organization is backed by one of the biggest steel men in the country and will be pushed with unlimited capital until there is a chain accessory store in every large town or city in the country. The Equipment Co., Kansas City, Mo., will be the hub of this new venture, and the plan of the organizers is to buy or control several first class accessory businesses and put them in first class condition.

### New Castle Drops Unguaranteed Tire

NEW CASTLE, PA., Feb. 2—The New Castle Rubber Co., this city, will stop the manufacture of unguaranteed tires and will turn out a new tire, to be known as the Shenango tire, as soon as proper machinery is installed. The manufacture of the guaranteed New Castle tire will continue.

### 360 Continental Engines in One Day

MUSKEGON, MICH., Feb. 5—A record for the production of motors was made by the Continental Motors plant Jan. 31, when 360 finished motors were turned out. This number was forty-six more than any previous day's record. During January the company put out 6,536 motors, or an average of 272 1/3 daily for 24 working days. This is 980 more motors than ever turned out by the local plant in a single month. In December the record was 5556.

### National Shipments Gain 100 Per Cent

INDIANAPOLIS, Feb. 3—The National Motor Car Corp.'s shipments in January were 100 per cent ahead of the corresponding month last year and 50 per cent ahead of the requirements in order to dispose of the year's output. The sales for the month of February, it is stated, will be correspondingly good.

### Acme 3 1/2-Ton Truck on Market

CHICAGO, Feb. 7—Cadillac Auto Truck Co., Cadillac, Mich., has added a 3 1/2-ton truck to its Acme line. The power plant is a type E, four-cylinder Continental, developing 48 hp. The wheelbase is 168 in., the chassis length 243 in. The chassis is designed to accommodate a 14-ft. body, and has a gasoline capacity

of 27 gal. The price of the truck fully equipped is \$3,000.

The equipment includes Rayfield carbureter, Eisemann magneto and Stewart-Warner vacuum feed. The engine has a Pierce governor, limiting speed to 14 m.p.h. The transmission is mounted amidship with three point suspension, and is of the sliding clutch type, gear always in mesh. There are three speeds forward and one reverse. Timken axles and bearings are used.

### 100 Anderson Cars a Day

ROCK HILL, S. C., Feb. 5—The Anderson Motor Co., successor to the Rock Hill Buggy Co., this city, is turning out 100 cars a day, and arrangements are being made to double the capacity.

### Weart Bound Brook Bearing President

BOUND BROOK, N. J., Feb. 2—Spencer Weart has been elected president of the Bound Brook Oilless Bearing Co., this city. He was formerly secretary and vice-president, these offices having been abolished. George Smalley, formerly second vice-president, has become first vice-president, director and general manager. W. F. Jennings was appointed Eastern sales manager, and H. J. Lindsey Western sales manager, with offices in Detroit. A. K. Smith has become production manager.

### Fishburn Reads Paper on Gears

FLINT, MICH., Feb. 5—O. E. Fishburn, of the Mason Motor Co., read his second paper on gears here last week before the Automobile Technical Society. The paper dealt with straight and spiral bevel gears as used in the automobile differential from their earliest development to the present time. Mr. Fishburn is now preparing papers for future delivery on other types of gears.

## Steinmetz To Talk on Engines

### To Lecture Before Philadelphia S. A. E. on Use of Combustion Engines in Modern War

PHILADELPHIA, Feb. 6—At the next meeting of the Pennsylvania Section of the Society of Automotive Engineers at the Engineers Club here Feb. 21, Joseph A. Steinmetz will lecture on the use of combustion engines in modern war. He has collected a great mass of information and photographs illustrating the use of motor vehicles on the fronts, with authentic pictures of the British tanks and also of some motor sleds which are quite new.

The Philadelphia section extends a most cordial invitation to other members to be present at this meeting.

## Chicago Salon Does Big Business

### Gains 500 % in Attendance—Re-engages Elizabethan Room for Next Year

CHICAGO, Feb. 5—In every particular the Chicago Salon of last week surpassed that of previous years. There was good business, an attendance of 12,000, which was 500 per cent more than last year, and additional floorspace. The charge of \$1 was made to keep out the less prosperous who would not be likely to buy a high-priced car. The management has contracted for the Elizabethan room in the Congress Hotel, where the salon was held this year, for 1918. Practically all of the available space has been allotted already, but it is hoped to enlarge the space by next winter.

There was good business with all exhibitors, and while sales were few inquiries were good. Louis Disbrow, showing his new racing car, stated to-night that he has contracted for over 170 cars wholesale through dealers and made seven individual sales. C. P. Kimball & Co., local body builders, reported more inquiries for custom-made bodies than a year ago. The White Co., which has been in the salon in New York and Chicago for the past 2 years, has made more individual sales at the salon than at the big show. Locomobile entered the New York and Chicago salons this year for the first time and was well pleased. The new Fageol was well received and several individual sales made. The Simplex has been doing good business in Chicago for over a year and made sales last week.

### S. A. E. Day at K. C. Tractor Show

NEW YORK, Feb. 7—A tractor meeting of the Society of Automobile Engineers will be held in connection with the Kansas City Tractor show on Wednesday, Feb. 14, in Kansas City. That day will be known as S. A. E. day at the tractor show, which is the largest tractor show held, and one which bears the same relationship to the tractor industry that the New York and Chicago automobile shows bear to the automobile industry. There will be a tractor supper held at Hotel Baltimore on that evening, which will be followed by several engineering talks on tractor matters. President Geo. H. Dunham, and General Manager Coker Clarkson will explain the standardization work of the society. As a tractor division of the standards work of the society has been formed, it is expected that considerable impetus will be given to tractor standardization at this first get-together of the tractor people, and the S. A. E.



## M. & A. M. Appoints Committees

### Executive Body Headed by Stiger—Girl Is Show Committee Chairman

NEW YORK, Feb. 6—The Motor and Accessory Manufacturers' Association has appointed the various committees to serve for the ensuing year. President C. W. Stiger will act as chairman of the executive committee. Those serving on this committee with Mr. Stiger are C. E. Thompson, E. H. Broadwell, J. H. Foster, W. O. Rutherford, Christian Girl and A. P. Sloan, Jr.

First Vice-President C. E. Thompson has been appointed chairman of the finance committee, which is composed of the same men who constitute the executive committee.

The show and allotment committee will this year be headed by Christian Girl, who will be assisted by C. E. Thompson, E. H. Broadwell, J. H. Foster, and W. C. Rands.

W. M. Sweet, former manager of the association, and who has for several years conducted the annual banquet, has been appointed chairman of the banquet committee, and will be assisted by E. H. Broadwell, T. J. Wetzel, J. H. Foster and Christian Girl.

The membership committee is composed of E. W. Beach, E. H. Broadwell and T. J. Wetzel. C. W. Stiger, Secretary A. P. Sloan, Jr., and Treasurer L. M. Wainwright compose the auditing committee, while the aeronautic committee consists of Messrs. Stiger, Thompson and Sweet.

#### Campbell Resigns from Stutz

CHICAGO, Feb. 7—Henry F. Campbell has resigned his position as secretary-treasurer of the Stutz Motor Car Co., Indianapolis. He will devote his time to private interests, and retain his stock interest in the company, of which he was a founder. William B. Thompson, formerly sales manager, succeeds him.

#### Chalmers Output Practically Sold

DETROIT, Feb. 6—The automobile show at Chicago witnessed closing of contracts for approximately 30,000 cars between dealers and the Chalmers Motor Car Co., practically taking the entire output of the company for 1917. One dealer signed a contract for 2700 cars for a single county.

#### Gordon Tire to Build

CANTON, OHIO, Feb. 2—The Gordon Tire & Rubber Co. has purchased three acres of land adjoining its plant and will build additions on it. Considerable con-

struction work is now going on at the plant and other extensions are planned for the near future.

C. W. McKone, superintendent of the plant since last November, has been made general superintendent, and H. R. Platt, formerly of the Batavia Rubber Co., has been made superintendent of the tire and tube department.

#### Dort Increases Capital \$1,000,000

FLINT, MICH., Feb. 6—The Dort Motor Co. has increased its capital from \$500,000 to \$1,500,000, of which \$918,000 has been issued and is paid up. The increase was subscribed by stockholders.

#### \$1,000,000 Plant for Diamond T

CHICAGO, Feb. 7—The Diamond T Motor Co., builder of motor trucks, is negotiating for the lease, with option of purchase of a \$1,000,000 factory to be erected on Kilbourne Avenue, this city.

#### Three Tire Companies to Build

CLEVELAND, Feb. 2—W. C. Owen & Co., engineers, have practically completed the new building of the Pearce Tire & Rubber Co., Ashtabula, Ohio, and are in the market for equipment for a 300-tire plant.

The same engineers have awarded the general contract for the first unit of the new plant of the East Palestine Rubber Co. to a building concern. This plant will have a capacity of 300 tires a day.

Plans and specifications have also been prepared by this firm for a new 400-tires-a-day factory of reinforced concrete for the A. L. A. Tire Co., and is preparing plans and specifications for remodeling the old plant of the Sycamore Tire Co., and an addition to the present building of the Boone Tire & Rubber Co., Sycamore, Ill.

## Kelly - Springfield Tire Earns 38.9%

1916 Income, \$2,117,314, Equal to 38.9% On Common—Gross Is \$3,464,459

NEW YORK, Feb. 1—The Kelly-Springfield Tire Co. in 1916 earned \$2,117,314, equal to 38.9 per cent on the \$4,907,200 common stock, after deducting \$215,598 dividends on the preferred. This compares with \$1,706,744 in 1915, or 29.67 per cent on the \$4,834,600 common. Gross profit in 1916 amounted to \$3,464,459, as against \$2,880,080 in 1915.

The earnings for the year ending Dec. 31, 1916, are compared with the 3 previous years as follows:

	1916
Gross profits .....	\$3,464,459
Operating expenses, etc. ....	1,404,388
Net operating income .....	2,060,071
Other income .....	57,243
Total .....	2,117,314
Interest .....	.....
Net income .....	2,117,314

## Car Makers To Aid Government

### Ford, Packard, Cadillac, U. S. Rubber and Goodrich Offer Factories for War

WASHINGTON, Feb. 7—President Wilson's answer to the German government carrying with it the possibility of war has been followed immediately by hundreds of industrial organizations offering their services to the country. The automobile manufacturers are in the front rank of the volunteers.

Henry Ford made a trip to Washington to offer the Ford Motor Co. plant for the government's use without profit, stating that the factories could turn out 1000 submarines and 3000 cars per day if necessary.

The Packard Motor Car Co. is ready to manufacture aeroplanes in whatever quantity needed. The Cadillac Motor Car Co. is willing to devote its entire organization to government uses. The United States Rubber Co. has offered its 47 factories' services to the federal authorities and the B. F. Goodrich Co. has made a similar offer of its resources.

The Du Pont Powder Co. and other munitions and steel factories of the country have volunteered. The Aero Club of America, the Wilmington Motor Show Assn. and other societies were among the first to indicate their willingness to serve.

#### Chandler's 1917 Contracts \$27,000,000

CLEVELAND, Feb. 2—The Chandler Motor Car Co. has closed contracts with its distributors totaling more than \$27,000,000 worth of cars for 1917. The company recently shipped 217 cars to one European agent. Within the last month large shipments have been made to Brazil, Denmark, Uruguay, New Zealand, Siam, Norway and China.

#### Big Order for Hayes Wheels

ST. JOHNS, MICH., Feb. 5—The Hayes Motor Truck Wheel Co. has received an order for 20,000 wheels for the Maxwell Motor Car Co., Inc. These are to be shipped at the rate of 2000 a month.

#### Columbia Motors Will Build

DETROIT, Feb. 5—The Columbia Motors Co. will erect a large factory, to be completed within a year, to provide sufficient space for the business the company foresees in the future.

1915	1914	1913
\$2,880,080	\$2,203,761	\$1,264,567
1,195,874	1,014,016	716,189
1,684,206	1,189,746	548,378
22,538	41,874	43,376
1,706,744	231,620	591,754
.....	16,476	32,210
1,706,744	1,215,144	559,544

## 216,936 Farmers in N. W. Future Buyers —Over 62,000 in Minn. Are Owners

90,000 Sales Estimated for 1917—Excellent Crops Predicted—  
Montana Wants Cars—Bank Clearings Large—Minneapolis Show Bigger with Promise of Record Sales

MINNEAPOLIS, MINN., Feb. 3—Fertile fields for the sale of automobiles in 1917 are found in territory fed by factory branches and distributing agencies situated here. And what is more, the people are able to pay for the cars they buy. One big section of this ground ripe for tillage by automobile manufacturers and their selling agencies is the farmer class. Just now it is the farmer that is most open for prospecting work. The latest automobile census goes to show that in the Northwest territory there are at least 216,936 farmers who have not yet fallen into line and become possessors of cars. This is aside from re-orders and additional orders by the approximately equal number of farmers who already own automobiles.

### 90,000 Cars in 1917

The harvest is ripe, for even conservative branch managers and dealers in this city estimate that to these farmers and to other probable buyers there will go out in 1917 about 90,000 cars, variously estimated at an average cost of from \$765 to \$900 each. The first figure will give a valuation of \$70,000,000 business for the year, while the more liberal estimate is \$84,000,000, as compared with 80,000 cars in 1916 from this market.

Bankers are a unit in saying that this territory, which for sales purposes may include beside Minnesota, the two Dakotas, eastern Montana, western Wisconsin and northern Iowa, is in prosperous condition. Although the crop as a whole did not come up to the figures for the bumper harvest of 1915, the average price was higher.

Banking conditions at the Twin City center will reflect the situation throughout the ninth regional reserve bank territory. Population of Minneapolis is 363,454 and of St. Paul 247,232. These are Federal estimates. Bank clearings in Minneapolis for 1916 were \$1,669,874,000 and for the Twin Cities, \$2,254,865,100 as against \$2,003,460,332 the year previous.

Bank transactions in Minneapolis for 1916 were \$5,440,770,000. On this basis the St. Paul estimate, no record being kept, will be \$2,900,000,000, or total \$8,340,000,000. Aggregate deposits in Minneapolis footed \$172,361,943 at the last call, compared with \$169,620,223 on Dec. 30, 1915. St. Paul figures were \$116,111,644 and \$105,143,027.

Chairman John H. Rich, of the Fed-

eral reserve bank, has shown gross earnings for the bank in the second annual report of \$238,000 and total resources of \$37,487,000, compared with \$99,600 and \$16,466,000 in 1915. He said: "Crop moving demands required a total of \$8,500,000, which was promptly put into circulation for handling grain. While the crop was far short of the 1915 crop the unusually high prices required a total issue for this purpose, which was \$500,000 in excess of the amount required to move the previous crop."

In general there may be gathered from this why automobile dealers as a class are expecting a tremendous year in sales, and why the increased figures for the tenth annual automobile show this week in the National Mazda Lamp building with its four floors and ten automobile display sections.

The floor space is 119,000 sq. ft. as against 65,000 in 1916. There are 238 exhibits, which is compared with 148 exhibits last year. In the automobile section there are seventy-two car exhibitors who show 300 cars. Last year there were 203 cars displayed by forty-eight dealers. In the accessory division are to be seventy-four exhibits as against forty-eight last year. Thirty-six commercial car exhibits are on the books compared with seven last year, and there are on show eight tractors; last year none. An additional interesting event is the use of 13,600 sq. ft. of floor space by sixty-four East Side manufacturers to demonstrate their business. All exhibits in the show are estimated at \$3,000,000 value.

### A Rich Territory

Farming, dairying, wool growing, livestock raising, manufacturing and iron mining may be considered among leading industries of the Minneapolis trade territory. They are all active. Laboring men have been receiving advanced wages, particularly in mining and manufacturing. This money is all going into circulation, due to high prices of living necessities. It is estimated more than \$3,500,000 a month is being paid in wages in the Butte and Anaconda district of Montana.

Select Minnesota creameries pay farmers in a year about \$30,000,000 for butter fat. Butter and milk add \$40,000,000. Livestock sold off the farms give the farmers \$30,000,000 up in a year. The hen division is estimated to

pay more than \$30,000,000. It was estimated by *Farm, Stock and Home* that the combined dairy and livestock receipts of Minnesota and the Dakotas are about \$200,000,000 a year. It figures estimated cash available at \$684,000,000, to which might be added the estimate by the Montana agricultural commissioner of \$94,936,090 crop value in 1916 for that State.

In the four principal States the total crop of wheat, corn, oats, barley, rye and flax amounted to 963,561,000 bushels by Government estimate valued at \$555,572,000.

### \$1,500,000 in Automobile Buildings

It is a sign of the times that more than \$1,500,000 is being spent in Minneapolis in automobile buildings in 1916 and to date. This includes the Overland \$500,000 distributing plant in the Midway at St. Paul and the proposed Maxwell plant on the Minneapolis side of the line to cost \$300,000, also the Overland retail plant in Minneapolis costing \$150,000. To this might be added the new plant of the Twin City Four Wheel Drive Co. near the Overland distributing building in St. Paul, costing about \$250,000. In branch and retail agency buildings about \$450,000 has been spent since the show a year ago.

Several new car, tire and truck agencies have entered the field. The Kelly-Springfield enlarged its agency to a branch. The Stewart-Warner Speedometer Co. opened a branch, also the Imperial Auto Supply Co. The Ahlberg Bearing Co. opened a branch and the Chalmers company. A million dollar company was formed to make the Ware truck in Minneapolis, the Four Wheel Drive Mfg. Co., and this bought the W. S. Nott Co. factory for building motor fire engines. The Twin City Four Wheel Drive Co. nearly doubled the size of a plant it opened early in the year.

At least twenty-five more companies were formed for automobile and accessory business, with a total authorized capitalization of \$1,250,000.

Summing up the trade possibilities, the big hope of the manufacturer in the four Northwestern States is the farmer. This is demonstrated strongly in the avidity with which automobiles are snapped up in Montana by the farmers and grazers. The automobile has become an economic necessity. It is shown conclusively by the fact that out of 155,000 farmers in Minnesota more than 62,000 own automobiles, and that half the farmers in these four States own cars.

### Cartercar and Duplex-Power Dissolve

LANSING, MICH., Feb. 3—The Cartercar Co., incorporated for \$350,000, and the Duplex-Power Car Co., incorporated for \$100,000, have been dissolved.



## Belmore Light Four and Six

Company To Build Series in Open and Closed Body Types—Colors Optional

TOLEDO, Feb. 6—The Belmont Motor Car Co., recently organized for \$125,000, as told in an earlier issue of THE AUTOMOBILE, has completed its plans, and will build a series of light cars of both four and six cylinders. The line will consist of a five-passenger Riveria model touring, four-passenger Chevy Chase model club, two-passenger Daytona racy roadster. In addition, there will be a touring sedan, coupé and all weather top in the closed type. There will be no standard color, each purchaser having his choice of a series of color combinations.

### Dayton Motor Truck Co. Formed

DAYTON, OHIO, Feb. 2—J. M. Dunwoodie, B. S. Murphy and other local business men have purchased the plant of the Durable Dayton Truck Co., this city, and have formed the Dayton Motor Truck Co. to resume operations at this plant. The company will have a capital of \$50,000 and will manufacture both worm and chain drive motor trucks of from 2 to 7½ tons capacity. Mr. Dunwoodie, who was formerly sales manager of the Stoddard Dayton company, has put the foreign business in the hands of Melchion, Armstrong & Dessau, New York.

### Stewart-Warner Charges Sparton and Heco Systems Infringe

CHICAGO, Feb. 7—Suits against the Sparks-Withington Co., Jackson, Mich., and against the Heinze Electric Co., Lowell, Mass., were filed by the Stewart-Warner Speedometer Corp. in the United States district court, Chicago, Feb. 2. The suits claim violation of patents covering vacuum tank system of gasoline feed to carbureter. Stewart-Warner states that any vacuum system is an infringement of Webb Jay patents and will be prosecuted.

### Double Shift for Reflex Ignition

CLEVELAND, Feb. 5—The Reflex Ignition Co., of this city, because of the increasing pressure of business is forced to adopt the double shift in its working staff. Beginning Feb. 15 the company announces it will employ a night force of 25 men in addition to its day payroll of 30 men.

Two new styles of product are announced by the company officials as just placed on the market. The first is style No. 21, an ignition especially adapted

for foreign make cars. The other new style is known as the Diamond Reflex, which is a large type plug particularly serviceable for heavy duty motors and racing cars. Both these new ignition styles sell for \$1.25 each.

The production of the Reflex Ignition Co. is announced as double that of last year. In 1916 the company turned out 500,000 ignitions and this year the output will reach 1,000,000. This has necessitated the night working force.

### Indian Rubber Co. Buys Land

AKRON, Feb. 5—The Indian Rubber Co., a recent concern in this city, has purchased 13 acres of land at Mogadore and will spend \$100,000 for buildings and equipment. The company is capitalized for \$125,000. J. M. Alderfer, J. K. Williams and R. M. Pillmore are chiefly interested.

### Louisville Maker for Kalamazoo

KALAMAZOO, MICH., Feb. 5—A manufacturer of automobiles, making 1500 cars yearly at prices ranging between \$1,800 and \$3,000, will soon move to this city from the South, to open a plant here. The maker has refused to divulge his name, but rumors state that it is a company now doing business in Louisville, Ky.

### Dale Body Co. Formed

FOSTORIA, OHIO, Feb. 3—As was foretold by THE AUTOMOBILE, the Dale Body Co. has been formed as a subsidiary to the Allen Motor Car Co. It is a part of the community the company is building by adding factories. Other organizations will be formed in the near future.

### Jay Resigns as Maxwell V.-P.

DETROIT, Feb. 7—John C. Jay, Jr., vice-president of the Maxwell Motor Co. has resigned. Mr. Jay recently resigned as chairman of the board of directors to become vice-president. He was chairman of the board for more than a year, James C. Brady recently succeeding him.

### Olympian Buys Cartercar Factory

PONTIAC, MICH., Feb. 7—Olympian Motor Co. has bought the old Cartercar factory and 15 acres of land for expansion purposes.

### Brisk-Blast Mfg. Co. at Monroe

MONROE, MICH., Feb. 2—The Brisk-Blast Mfg. Co., St. Louis, Mo., will move its plant and seventy-five of its workers to this city in the near future. The company is capitalized for \$200,000 and manufactures such accessories as tire pumps, grease guns and jacks.

## First Pull-More Factory Ready

\$1,000,000 Company to Manufacture Trucks by Mar. 1  
—100 a Month by June

PITTSBURGH, PA., Feb. 1—The new plant of the Pull-More Motor Truck Co., New Castle, Pa., is fast nearing completion. It is planned to begin manufacture by March 1, and to produce twenty-five Pull-More trucks during April. It is expected that the production will be increased to at least 100 vehicles per month by June 1.

The Pull-More Motor Truck Co., is a new \$1,000,000 concern with the following officers: E. M. S. Young, formerly vice-president of the Standard Gage Steel Co., Beaver Falls, Pa., president and general manager; Col. H. P. Bope, first vice-president and general sales manager of the Carnegie Steel Co., vice-president; Kenneth R. Cunningham, secretary and treasurer; J. M. Richards, works manager, H. H. Marker, chief engineer and R. C. Spohn, sales manager.

Pull-More trucks will be manufactured in one model of 3 tons capacity and will sell at about \$3,400 in the chassis. The vehicle has an unusual power plant assembly which drives to the front wheels and the upper half of which may be revolved, together with the complete cab, about hinges on one side. This exposes the crankshaft and crankpin connecting-rod bearings, the clutch, gearset and differential, so that inspection and repair of these parts may be made in much less time than is usually the case in the truck of conventional design. The power plant and the front wheels are in a unit by themselves and connected with the usual body and rear wheels by means of a special reach and drawbar attached to the front axle. The front end is also provided with a set of hinged auxiliary wheels which may be lowered when it is desired to disconnect the loaded body and move to a new position to connect up a second loaded rear end.

### Brazil Co. to Build Front-Drive Trucks

INDIANAPOLIS, IND., Feb. 4—The Brazil Motors Co., of Brazil, Ind., just incorporated with a capitalization of \$150,000, has purchased the plant of the Brazil Fence Co., and will engage in the near future in the manufacture of a front-drive motor truck.

### Harroun Makes Contract with Timken

DETROIT, Feb. 5—The Harroun Motor Corp. and the Timken Roller-Bearing Co. have closed a contract for bearings for Harroun cars.

CLINTONVILLE, Wis., Feb. 3—The Four Wheel Drive Automobile Co., this city, at its annual meeting this week authorized a cash dividend of 15 per cent and a stock dividend of 100 per cent on a capital stock of \$500,000. This will increase the capitalization to \$1,000,000. The distribution is approximately equal to that made at the annual meeting of 1916, when a stock dividend of

[illegible]



100 per cent and a cash dividend of 30 per cent on a capitalization of \$250,000 was authorized. The company has more than doubled its factory facilities during the past year and still is engaged in making extensions. The report of President Olen stated that if no more orders were accepted after Jan. 1, 1917, the factory would be fully occupied for more than 6 months. All of the officers were re-elected, as follows: President, W. A. Olen; vice-president, D. J. Rohrer; secretary, Frank Gause; treasurer, D. J. Rohrer.

#### Lang to Manufacture Bodies

CLEVELAND, Feb. 3.—E. J. Lang, formerly retail sales manager of the Baker R. & L. Co., and son of Charles E. J. Lang, founder of the Rauch & Lang Carriage Co., has resigned, effective Feb. 15, and will go into business for himself, manufacturing automobile bodies. Mr. Lang has been with the Baker R. & L. Co. for 12 years.

#### Boynton Is Packard Purchasing Manager

DETROIT, Feb. 7.—F. W. Boynton has been appointed purchasing manager of the Packard company. He has been with the concern for 9 years. R. M. Anderson has been named as research engineer with Frank Wahl as his assistant.

#### Dividend Declared

Mitchell Motors Co., second quarterly of \$1.50 a share, payable Feb. 24 to stock of record Feb. 10.

## Upward Trend in Stock Prices

### Automobile Shares Rise Sympathetically with War Brides on Bull Movement

NEW YORK, Feb. 7.—Automobile and accessory issues have risen in price the last few days in general sympathy with the war brides. At the present time the market is in a peculiar position. The if factor makes possible either a bull or bear movement. The bulls have had the upper hand since Monday, and prices have generally risen.

Up to Monday, automobile and accessory prices were, on the whole, much lower than the week before. Tire issues were weak and motor stocks were under pressure. Yesterday, however, the whole list was strong. Chandler closed 2½ points higher, at 97½; General Motors reached 108; and Maxwell, Studebaker and White were strong, with substantial gains.

Pierce-Arrow rose 5¼ points to 51½; United Motors was ¾ point higher, quoting at 39¾.

#### Smith Truck Increasing Shipments

CHICAGO, Feb. 2.—During the first 16 days of January, the Smith Motor Truck Corp. shipped 555 attachments. It is expected that the total for the month will exceed 1,400. Operations in the closing months of 1916 were affected by the restriction of production on the part of

automobile makers on account of the shortage in freight cars.

Contracts for 1917 by the Smith Motor Truck Corp. already received from agents aggregate 15,000. Shipments in December were 676 attachments; in November 697, in October 836, in September 679; and in August 1,152.

#### Ford Surplus \$120,000,000

DETROIT, Feb. 5.—The Ford Motor Co. had a surplus on Jan. 18 of \$120,000,356 as compared with \$111,960,907 July 31, 1916, and \$59,135,771 July 31, 1915. Assets were \$137,547,038.

The tabulated statement follows:

ASSETS		
	1916	1915
Real estate.....	\$ 26,739,261	\$17,208,081
Machinery .....	12,445,377	11,863,548
Material .....	45,297,639	19,982,355
Cash .....	53,964,760	32,644,676
Patents .....		62,622
Total .....	\$137,547,037	\$81,761,282
LIABILITIES		
	1916	1915
Capital stock.....	\$ 2,000,000	\$ 2,000,000
Accounts payable....	15,546,681	5,694,021
Reserves .....		3,446,260
Floating debt.....		4,964,788
Surplus .....	120,000,356	65,656,213

#### Pa. Railroad Buys Paige Plant?

DETROIT, Feb. 7.—It is reported that the Pennsylvania Railroad has purchased the plant of the Paige Motor Car Co. which Paige leases, and the latter has bought 51 acres of land on which a new plant will be erected.

#### 100% Dividend for Hydraulic Steel

CLEVELAND, Feb. 6.—The directors of the Hydraulic Pressed Steel Co., this city, are considering a proposition to declare a stock dividend of over 100 per cent on

### Automobile Securities Quotations on the New York and Detroit Exchanges

	Bid	Asked	Net Ch'ge
Ajax Rubber Co.....	68½	70	—6
J. I. Case T. M. Co. pfd.....	83	88	—2
Chalmers Motor Co. com.....	30	34	—2
*Chandler Motor Car Co.....	92½	100	—6½
Chevrolet Motor Co.....	98	103	—2
Fisher Body Corp. com.....	37	40	..
Fisher Body Corp. pfd.....	93	97	..
Fisk Rubber Co. com.....	75	85	..
Fisk Rubber Co. 1st pfd.....	104	108	—6
Fisk Rubber Co. 2d pfd.....	80	100	—10
Firestone Tire & Rubber Co. com.....	140	144	—4
Firestone Tire & Rubber Co. pfd.....	108	109	..
*General Motors Co. com.....	106½	108	—7¾
*General Motors Co. pfd.....			..
*B. F. Goodrich Co. com.....	54¾	55	—4¾
*B. F. Goodrich Co. pfd.....	109½	113	—1½
Goodyear Tire & Rubber Co. com.....	270	275	—7
Goodyear Tire & Rubber Co. pfd.....	107	108	—½
Grant Motor Car Corp.....	6	8	—1
Hupp Motor Car Corp. com.....	4	5	—1
Hupp Motor Car Corp. pfd.....			..
International Motor Co. com.....	16	20	+1
International Motor Co. 1st pfd.....	65	75	..
International Motor Co. 2d pfd.....	25	35	..
*Kelly-Springfield Tire Co. com.....	53	54	—5½
*Kelly-Springfield Tire Co. 1st pfd.....	90	92	..
*Lee Rubber & Tire Corp.....	22½	23	—1½
*Maxwell Motor Co. com.....	51	51½	—3¾
*Maxwell Motor Co. 1st pfd.....	65½	68	—6½
*Maxwell Motor Co. 2d pfd.....	34	36	—4
Miller Rubber Co. com.....	255	265	+1
Miller Rubber Co. pfd.....	105¾	106¾	..
Packard Motor Car Co. com.....		152¾	..
Packard Motor Car Co. pfd.....		102¾	..
Paige-Detroit Motor Car Co.....	38	39	—2¾
Peerless Truck & Motor Corp.....	16	18	..
Portage Rubber Co. com.....	166	172	..
Regal Motor Car Co. pfd.....	27	35	—3
Reo Motor Car Co.....	34½	35	—12
Saxon Motor Car Corp.....	51	60	—7
Springfield Body Corp. com.....	70	90	..
Springfield Body Corp. pfd.....	110	125	..

	Bid	Asked	Net Ch'ge
Standard Motor Construction Co.....	5	6	+½
†Stewart-Warner Speed. Corp. com.....	81½	82½	—17¾
*Studebaker Corp. com.....			..
*Studebaker Corp. pfd.....	80	85	—4
Swinehart Tire & Rubber Co.....	39	39½	—2¾
United Motors Corp.....	55½	55½	—4½
*U. S. Rubber Co. com.....	105	109	—4¼
*U. S. Rubber Co. pfd.....	47½	48	—3½
White Motor Co.....	31¾	32	—3¾
*Willys-Overland Co. com.....	95	98	—2½
*Willys-Overland Co. pfd.....			..

\*At close Feb. 5, 1917. Listed New York Stock Exchange. †Ex-div.

### OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE ACTIVE STOCKS

	Bid	Asked	Net Ch'ge
Auto Body Co.....		35	..
Chalmers Motor Co. com.....			..
Chalmers Motor Co. pfd.....			..
Continental Motor Co. com., new.....	8½	9¼	—30
Continental Motor Co. pfd., new.....	97½		—1
Ford Motor Co. of Canada.....		225	..
General Motors Co. com.....			..
General Motors Co. pfd.....			..
Maxwell Motor Co. com.....	49	52	—5
Maxwell Motor Co. 1st pfd.....			..
Maxwell Motor Co. 2d pfd.....			..
Packard Motor Car Co. com.....		155	..
Packard Motor Car Co. pfd.....		101¾	..
Paige-Detroit Motor Car Co.....		39¾	..
W. K. Prudden Co.....	36		—1½
Reo Motor Car Co.....	99	102	—7
Studebaker Corp. com.....			..
Studebaker Corp. pfd.....			..
C. M. Hall Lamp Co.....			..

### INACTIVE STOCKS

	Bid	Asked	Net Ch'ge
Atlas Drop Forge Co.....	38		+1
Kelsey Wheel Co.....	50	54	..
Regal Motor Car Co. pfd.....	27	35	..

the common and to issue additional common stock in connection with the recent acquisition of the Cleveland Welding Mfg. Co.

A deal has been pending which, if carried through, would have resulted in the Rockefeller interests obtaining a big control in the Hydraulic company, but the fact that the stock dividend is now under consideration indicates that the Rockefeller transaction has not been closed.

#### Two New Silvox Products

SOUTH BETHLEHEM, PA., Feb. 6—The Silvox Co., this city, maker of Bethlehem 5-point spark plugs, will soon announce two new automobile specialties. The first of these is a low price one-point spark plug, which is now coming through in large quantities. Deliveries will soon begin. The second consists of a pneumatic shock absorber made to sell at a popular price and specially designed for Ford cars. An important feature of this latter is that air is used instead of springs.

#### York Show Sells 100 Cars

YORK, PA., Feb. 7—A remarkably heavy sale of cars in proportion to the attendance was the feature of the York show. The exhibitors disposed of 100 automobiles to 15,000 visitors, or a car to one person out of each 150 at the show. The industrial growth of this section, together with the fact that it is a rich grain section, leads the dealers to look forward to 2500 sales within the coming year. A report of the industrial and agricultural wealth of this territory will appear in an early issue.

#### Reorganize K. D. Carburetor Co.

CLEVELAND, Feb. 7—The K. D. Carburetor Co. has been reorganized with a capital stock increase of \$275,000. It has purchased the plant of the Atlas Bolt & Screw Co. and will move into the new quarters as soon as the present tenants have vacated.

#### Four New Bearings Service Branches

NEW YORK, Feb. 6—The Bearings Service Co., with general offices in Detroit, and branches in all the principal cities, will open four new branches this spring. These will be at Philadelphia, Rochester, N. Y., Cleveland and Indianapolis. At present it has eleven branches in New York, Chicago, Detroit, Boston, Kansas City, Minneapolis, Seattle, Atlanta, Dallas, San Francisco and Los Angeles. This company was organized last year by the Timken, Hyatt and New Departure bearings companies to handle their service to the customer. The service is direct from the branch.

## Independent Truck at \$1,100

### Company Will Open Plant in Davenport—To Make All Parts Except Axles

DAVENPORT, IA., Feb. 3—The Independent Auto Truck Co. will open a plant in this city to build a truck selling at \$1,100. The company will be incorporated for \$50,000, the incorporators being Charles Zoller and E. August. Mr. Zoller is president.

Three buildings, comprising the southwest portion of the Independent Brewing & Malting Co., have been converted into a manufacturing plant. About 24,000 sq. ft. of floorspace will be utilized by the company. With the exception of the axles all the parts will be manufactured at the local plant.

#### New Factory for American Truck

DETROIT, Feb. 7—The American Motor Truck Co., incorporated for \$600,000, will begin work within 30 days on a plant in southwestern Detroit on the Michigan Central tracks.

#### Wilmington Show Attendance 60,000

WILMINGTON, DEL., Feb. 7—Attendance at the Wilmington show held in the Hotel Du Pont last week exceeded all expectations by reaching the 60,000 mark. Dealers paid \$105 toward the end of the week for unallotted space which had been priced at \$35 on the first day. There were thirty-one exhibitors, and at least

fifty cars were sold. The munitions, leather, fiber, and farming interests of the territory have been extremely prosperous in the past year. A detailed account of the resources of this region will be published in an early issue of THE AUTOMOBILE.

#### U. S. Chamber Elects Officers

WASHINGTON, D. C., Feb. 3—R. Goodwyn Rhett of Charleston, S. C., has been re-elected president of the Chamber of Commerce of the United States, following the fifth annual meeting of that organization held in Washington last week.

Other officers of the National Chamber have been re-elected as follows: Harry A. Wheeler of Chicago, John H. Fahey of Boston, and A. B. Farquhar of York, Pa., honorary vice-presidents; Samuel McRoberts of New York City, vice-president; and Joseph H. Defrees of Chicago, vice-president and also chairman of the executive committee.

John Joy Edson of Washington has been re-elected treasurer. The newly elected officers are: Hon. Charles Nagel of St. Louis, honorary vice-president, and Willis Booth of Los Angeles, vice-president.

James Couzens, formerly vice-president, treasurer and general manager of the Ford Motor Co., Detroit, was re-elected a director of the chamber, as were R. T. Cunningham, Fairmont, W. Va.; R. G. Rhett, Charleston, S. C.; L. C. Boyd, Indianapolis; E. T. Meredith, Des Moines; Thos. B. Stearns, Denver; and A. I. Esberg, San Francisco. New members of the board are: F. H. Johnston, New Britain, Conn.; Lewis E. Pierson, New York; H. A. Black, Galveston, Tex.; C. H. Howard, St. Louis; and J. E. Chilberg, Seattle.

#### To Wind Up Streator Affairs

STREATOR, ILL., Feb. 2—Creditors of the defunct Streator Motor Car Co. have received word from E. U. Henry, referee in bankruptcy, that a meeting of the creditors will be held in Peoria, Ill., on Feb. 10, to wind up the affairs of the concern. The sum of \$9,166 is on hand.

#### Motor Castings Co. in Receivers' Hands

DETROIT, Feb. 7—The Motor Castings Co. has been placed in receivers' hands. Assets are \$225,000, and liabilities \$100,000. The company manufactures cylinder castings. The company may continue operations pending reorganization.

#### National Show Mgrs. Assn. Organization Completed

CHICAGO, Feb. 2—The organization of the National Assn. of Automobile Show Managers has been completed. At a luncheon in this city last week, about thirty men attended and made the organization permanent. Much data is to be



PERCY MARTIN

Mr. Martin, an American engineer, has been appointed engine controller of the British Empire and a member of the Imperial Air Board



collected and an effort made to establish a standard of show management. An exchange of ideas will result in certain improvements in several of the remaining shows of this season. Membership is to be by associations, so that a city may still be represented should it change managers. Or, the president or some other association officer may represent that show at the meetings.

#### Appleby Heads Erd Motor Co.

SAGINAW, MICH., Feb. 5—The Erd Motor Co. held its annual election last week and elected the following officers and directors: Officers—B. G. Appleby, president; J. G. Erd, vice-president; H. S. Erd, secretary; A. W. Seeley, treasurer and manager. The above officers and O. L. Dittmar, C. F. Beach, W. J. Passolt and R. Knapp compose the directors.

The company is employing seventy men and makes engines for tractor companies.

#### Wolverine Wants Factory Location

WAYNE, MICH., Feb. 7—The Wolverine Car & Tractor Co., whose temporary assembling plant is located here, is looking for a permanent factory location. William G. Wagenhals is president of the company.

#### Bikle, of Lycoming Foundry, Dead

WILLIAMSPORT, PA., Jan. 28—E. B. Bikle, assistant secretary and treasurer and office manager of the Lycoming Foundry & Machine Co., this city, died to-day. No successor will be appointed until the next meeting of the board of directors.

#### Wisconsin Motor Moves N. Y. Office

NEW YORK, Feb. 2—The local offices of the Wisconsin Motor Mfg. Co., Milwaukee, Wis., have been established at 21 Park Row. T. M. Fenner is Eastern factory representative.

#### A. A. A. Tests Osgood Lens

CHICAGO, Feb. 5—The Osgood lens, made by the Osgood Lens & Supply Co., this city, recently passed a test of the Contest Board of the American Automobile Assn. on control of the light from headlamps. The demonstration was made in a series of tests made on the local speedway.

A Hudson car equipped with regular lamps made by the C. M. Hall Lamp Co. was used, the light being projected on a screen 7 ft. high and 65 ft. long. At 50 ft. and 75 ft. distance the light beams cut the screen 25 in. from the roadway and were horizontally diffused 15 and 18 ft. respectively. At 150 ft. the light cut the screen 24 in. from the roadway and was diffused horizontally 35½ ft. At 250 ft. the height at which the light beams struck the screen was indeterminate, though the horizontal diffusion was 60 ft. A test to determine the total carrying power of the lenses shows the light capable of casting a shadow at 1800 ft.

## 1916 Racing Winners Banqueted

### Important Announcements for 1917 at Chicago Event—Speedways to Be Safer

CHICAGO, Feb. 1—Dario Resta and Johnny Aitken, 1916 racing champion and runner-up, respectively, were tonight crowned with the laurels coincident to their achievements in the realm of speed, the occasion being the banquet tendered in their honor by the American Automobile Assn. at the Chicago Automobile Club. After the award of the Bosch and Goodrich prize money and Bosch trophy to Resta, Aitken and Rickembacher, together with a diamond-set platinum fob to Resta from the American Automobile Assn., several important racing announcements were made for the coming year.

The Bosch Magneto Co. will offer a similar purse and cup to go to the winner of the championship of 1917 under the same conditions as in 1916.

The Hudson company will have five cars on the speedways this year, with Arthur Hill, former manager for Resta, as team manager. Mulford will be the star driver for the team, Billy Chandler will be in charge of the mechanical end, and Ira Vail also will drive. The other two drivers have not been decided upon.

James Allison announced that Indianapolis will go back to the 500-mile race this year. The Indianapolis management considers taking the Decoration Day classic to Cincinnati unless hotel managers in Indianapolis unanimously agree upon a program of normal hotel rates for race meet days.

Clifford Ireland gave his personal version of some angles of race management, although he said his remarks were not to be construed as coming from the contest board as a whole. He called attention to there having been fifteen men killed on the tracks and speedways last year.

"Only one speedway, in my opinion, is properly constructed," he declared. "Perhaps it is because the contest board is not properly represented that accidents occur. I believe most of the speedways try to live up to the rules, although some try to avoid the safety-first idea. If a representative of the contest board lives up to the board's instructions he goes up against a stone wall—he either jeopardizes the speedway investment by calling the race off or he is lax in his duties."

James Allison, head of the Indianapolis speedway, declared that the Indianapolis course was believed safe when it was built and that much money

has been spent in making it more safe each year. He said that the difference in the speed of present day racing cars as compared with that of a few years ago had caused the management to decide upon the building of a safety apron and wall on the back stretch of the Indianapolis course before next year.

He advocated a committee made up of some representative of the contest board, of the race drivers and of the speedway management, whose duty it would be to visit the track 30 days prior to the date of the race and point out any means thought necessary for making the track more safe. This would give the speedway management time to make the changes, and unless the changes were made as specified the sanction should be withdrawn. He did not favor withdrawing sanction unless the speedways were given sufficient time to make necessary changes.

#### A. A. A. Contest Board to Issue Racing Directory

NEW YORK, Feb. 3—The Contest Board of the American Automobile Assn. is publishing a directory of all racing events to date. This directory is on the press now and will be out around March 1. It is complete in every detail, covering the results of all trials, reliability contests, road and track events, and hill-climbs. It also includes all the Glidden tours and a complete summary of the 1916 speedway championship events. The new official standing records recognized by the A. A. A. contest board are also included.

#### Ohio Light Bill Passed by Senate

CLEVELAND, Feb. 6—The Terrill Bill requiring lights on all vehicles, both horse and motor propelled, has passed the State Senate at Columbus and is now pending in the House. The bill was drafted by the Ohio State Automobile Assn. It was introduced by Senator Virgil Terrill of Cleveland.

#### Dr. Lewis Goodyear Consulting Chemist

CLEVELAND, Feb. 3—Dr. Warren K. Lewis has been named consulting chemist by the Goodyear Tire & Rubber Co., Akron. Dr. Lewis is professor of chemical engineering at the Massachusetts Institute of Technology and is an expert on the chemistry of rubber processes.

#### Bennett with Service Motor

CHICAGO, Feb. 7—William H. Bennett has joined the advertising forces of the Service Motor Supply Co. He was formerly advertising manager of the Searchlight Co., Chicago, which has been consolidated with the Air Reduction Co. of New York.



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## Foreign Trade Foundations

BECAUSE the world's supply of gold has flowed so rapidly into our treasuries during the past 2 years, and because the stock of gold in Europe is correspondingly depleted is no reason why we should imagine those countries are correspondingly impoverished and we correspondingly enriched. Our present abnormally large gold supply is no assurance that our foreign trade must be great in the future. It is no assurance that we may hold what we have at present.

### Gold Must Be Used

This gold is only of value in proportion as we use it, and in accordance with how we use it. If we use it as to make it easier for foreign lands to trade with us, to buy those natural or manufactured products we have for sale, then our wealth as a nation and our position in foreign trade is correspondingly improved; but if, on the other hand, we worship it as so much yellow metal and ensconce ourselves behind its apparently impregnable ramparts, we are playing the ostrich game of burying our heads in the sands and our deeds will fall on our own shoulders.

The foreign countries after the war will only buy from us those goods they are in need of and can most conveniently buy from us on terms convenient to them and at times to meet their convenience. Our gold is not going to be a trade whip such as many imagine it is. The financial center of the world has

not been shifted across the ocean by the present transfer of securities and gold. Europe that originated world trade, that originated world finance, that originated world exchange, still holds the center. In spite of the enormous war those allied nations such as Great Britain, France and Italy are enjoying the greatest world trade in their history, and they are to-day and have been for 2 years laying plans for a more vigorous world trade drive.

### Ships, Co-Operation and Tariff

Our masses of gold will stand us in poor stead unless we are ready to meet the experienced trading nations of the world on an equal foreign trade basis. At present we are not qualified to do this. Our greatest need is to-day to begin creating some of those great essentials that seem to-day to be the real necessary corner stones of foreign trade, a merchant marine, a bargaining tariff and legislation which will legalize co-operation of our manufacturers, and selling organizations in foreign trade. Each company can work its best individual plan for foreign trade, but all of their efforts will show much greater results if nationally we can stand back of them with this great trinity of export trade—ships, co-operation and tariff.

## Hidden Grease Cups

CHASSIS lubrication is not as highly developed as engine lubrication. It is only necessary to stop to think how disastrous it would be for the average engine life if crankshaft lubrication were made as difficult as that of some of the chassis points, to realize this. It does not seem possible to say that a chassis is highly developed in which the driver, who is most often the owner, has to climb beneath the car every few hundred miles in order to secure proper lubrication.

Some of the chassis exhibited at the show this year had as many as from five to seven grease cups located directly in the center of the chassis at such points that they could not possibly be reached except by climbing under the car. Suppose such a car is driven for a few weeks over muddy and bad roads, is it not almost certain that the lubrication of these vital points is going to be neglected? Can any one look forward with pleasure to the duty of refilling these cups with grease and under the difficulties of a strained position, and an accumulation of dirt, of replacing the cup?

If the cup must be put under the car at the center of the chassis could not an opening be left above through the floor board for reaching it? A short pipe connection could readily be used to bring the cup to a point convenient for refilling through the bottom of the car. It is a question that is serious. Owner-drivers will not, as a class, give concealed and inaccessible grease cups the proper attention. Chauffeur-drivers, as a class, are not greatly ahead of the owners in this respect. It is up to the engineer to make chassis lubrication a study and to produce a scheme in which the inconvenience of the owner and driver will be brought to a minimum.



# How S. A. E. Could Help in War

## President Dunham Points Out Society's Industrial and Military Value—Highly Trained Body, Used to High-Pressure Work of Immense Assistance

**D**ETROIT, Feb. 6—George Dunham, president of the Society of Automotive Engineers, told a representative of THE AUTOMOBILE to-day what the society would do for the government in case of war. Mr. Dunham said that the society as an organization has in its membership the very men that would be needed in case matters came to a climax. He pointed out the great part in present-day warfare that the internal combustion engine is playing, not only at the actual front but throughout the great industrial areas necessary to maintain the fighting line.

Mr. Dunham stated that for every man at the front it is necessary to set seven others to work to support him. The man with the gun is only a small part of the organization of an army and the great work that is being done with the other parts of the unit is largely being accomplished with internal combustion engines.

To meet this requirement the S. A. E. has men who have made this particular science the study of their lives. Mr. Dunham stated that the organization as a whole is at the disposal of the government and that individually he had already had a number of offers of unlimited services to the government from different members of the society. These offers will be submitted to the government.

In the matter of industrial organization Mr. Dunham stated that the S. A. E. would be particularly valuable because it is made up of men who are accustomed to thinking

and acting quickly. The quick growth of the automobile industry which has involved numerous revisions of method in every department of the work has caused this. He stated that war is more or less of an industrial race and the help of an organization which has been actively engaged at maximum speed for a number of years could not but be valuable in a time of necessity.

### S. A. E.'s Part in War

Speaking of the particular fields in which the society would be particularly valuable, Mr. Dunham mentioned the commissary and signal corps departments with which co-operative work has been carried on for some time. In addition the manufacturing resources for munition making are almost unlimited. Coker F. Clarkson is in Washington at the present time and part of his visit is particularly concerned with ascertaining the directions in which the society could be of assistance. Secretary Daniels, of the navy, has frequently conferred with the officials of the organization on the part it could play in a scheme of national defense and has been particularly impressed with the great help that could be rendered in aeronautical work.

The automotive industry, Mr. Dunham showed, is essential on the sea, in the air and on land; and the Society of Automotive Engineers is ready and able to become a valuable aid in case of necessity.

## Automobile Engineers in Reserve Corps

**F**OLLOWING the tender of service long ago made the government by the Society of Automotive Engineers, and in pursuance of the society's co-operation with various government bureaus in the formulation of military truck, aeronautic and kindred standards, many S. A. E. members have applied for and some have received appointment as officers in the reserve corps of the War Department. In the potentially if not actually critical situation of world affairs involving immediately the United States, a general statement of the types of men desired by the government from civilian life now is of interest. Many applications are now at hand in Washington, but additional ones are wanted to meet all possible emergencies. It is not for the best interest of the government or individuals for the latter to enter the reserve service until they shall have decided that if necessity come they can conveniently and willingly serve to the end.

The object in organizing the Quartermaster Reserve Corps is to obtain high-class specialists, to serve according to their previous training and knowledge and be so prepared that in the event of the President calling for their services, they will be capable of rendering efficient service without further training. A reserve officer is appointed for a period of 5 years; must, so ordered, attend each year an army encampment for a period of 2 weeks; and present himself for active duty at the proper place in time of actual or threatened hostilities.

In listing suitable persons to be commissioned in army corps in connection with motor transportation, the members

of the Society of Automotive Engineers will naturally be drawn upon very largely. Men from this organization will have to be depended upon as technical advisers of the officer grade to supervise the operation on a large scale of motor truck companies and the requisite repair shops. A considerable number of men qualified as foremen in and superintendents of shops are needed by the army as truckmasters with motor companies. A large number of chauffeurs and mechanics must be listed. The S. A. E. members from their wide and intimate connection of the automobile industry will be able to provide from men employed by them or of whom they know, adequate lists of the last named four classes of men.

In general the S. A. E. members will serve as authorities in the design of engines, in metallurgy, electrical engineering, development of starting and lighting systems for aeronautic work, searchlight signalling, adaptation of wireless equipment to aeroplane use, mounting engines in aeroplanes, and conducting supply depots and parts service stations. Prompt movement of truck trains, without delay caused by a single breakdown, is essential in military transport.

Men desiring to be appointed officers in the reserve corps should make application to the War Department, Washington, addressed to the respective corps, whether it be the Aviation Section, the Quartermaster Corps, the Engineers or the Ordnance or other corps. Full information and necessary blanks will be furnished by the War Department. The data

wanted refer to previous service in the regular army, or volunteer forces of the United States, or organized militia of any state; education; experience; age. Letters of recommendation from three citizens, with address, are to be furnished.

### The Aeronautic Field

As broad a field as any for automobile engineers in the army is the aeronautic service. In addition to the activities mentioned above, inspectors are needed for aeroplanes and engines under order, as well as stock purchasers in general. Observation balloons, gas generating plants, equipment for balloon operation such as winches, are to be thoroughly developed and produced. Men are needed to work on the question of stresses in rigid dirigible airships; specialists in light, strong, alloyed metals.

Documentary evidence as to past work and character must be produced by applicants for positions with the Aviation Section. Severe physical examination is required at present of applicants as aviators. For other positions the respective work for which a man is suited is considered in the physical examination. Information as to place of physical examination is furnished upon application.

The pay and allowances of officers in the reserve corps

are the same as those of regular army officers of the same grade. The allowances include transportation, medical attendance and quarters.

There are over 100 government aeroplanes in flight service to-day, as compared with twelve a year ago. Five hundred will be in service, it is understood, at a relatively early date.

There are 50 rated military aviators to-day, in addition to 50 officer students at San Diego. There are 50 reserve corps aviators in various stages of advancement.

About 650 elementary licenses have been issued to aviators in this country since the beginning of the war. A goodly number of the men to whom these licenses were issued are not now available for service. About 70 expert licenses have been issued.

A great deal of training is necessary after a man receives his pilot's license before he can qualify for an expert's license. It takes 6 months to train a man holding an elementary license to become an expert.

The San Diego school specializes in the training of officer aviators. The schools in Mineola, L. I., and Chicago conduct the advance training of reserve corps fliers.

The essential temperamental characteristics of an aviator are mental alertness, decisiveness and good judgment; mechanical knowledge, particularly of combustion engines, is invaluable.

## S. A. E. Council Approves Standards Committee Draft

(Continued from page 309)

sponse. Automobile show week in New York is invariably overcrowded with banquets and other functions, whereas Chicago show week is rather lean on such performances. Chicago hotels have accommodations for banquets with attendance as high as 800, which is practically the same as New York. It would be possible to have a 1-day winter session in Chicago which might be attended by a great many who have not the opportunity of going to New York, but who are always present at the Chicago show.

A complete draft of the Standards Committee for 1917 follows:

The society has made several important changes for 1917 in the different divisions. Chas. M. Manly has become chairman of the Aeronautic Engine Division. The other members of this division consist of Henry Souther, H. M. Crane, F. S. Duesenberg, J. G. Vincent, Spencer Heath, Capt. V. E. Clark, G. C. Loening, C. B. King, and S. D. Walden.

F. G. Hughes is chairman of the Ball and Roller Bearings Division, the other members consisting of G. R. Bott, T. V. Buckwalter, C. H. Clement, F. M. Germane, B. D. Gray, F. J. Jarosch, R. S. Lane, C. W. McKinley, G. A. Ungar, and M. W. H. Wilson.

F. L. Morse is chairman of the Chain Division. There are five other members, as follows: W. J. Belcher, H. F. Funke, J. R. Cautley, J. C. Howe, and H. S. Pierce.

A Data Sheet Division of the Standards Committee has been re-established, with A. C. Bergman as chairman. The other members of this division will be announced later.

The Electrical Equipment Division will be continued with substantially the same membership as last year, including A. L. Riker, Joseph Bijur, Alex. Churchward, O. F. Conklin, Frank Conrad, W. A. Chryst, C. F. Gilchrist, D. M. Leece, T. L. Lee, A. D. T. Libby, and A. H. Timmerman.

The Electrical Vehicle Division will be continued, A. J. Slade retiring as chairman but continuing as a member of the division. The other members of the division will be A. S. Baldwin, E. P. Chalfont, J. H. Hertner, W. P. Kennedy, F. E. Queeney, E. J. Ross, Jr., and E. R. Whitney.

The Engine and Transmission Division will consist of the following members, though it is expected later that the list will be increased in size somewhat: W. T. Fishleigh, R. J. Broege, A. W. Copland, W. A. Frederick, L. C. Fuller, E. G. Gunn, H. L. Horning, A. F. Milbrath and H. C. Snow.

The Foreign Co-operation Division will consist of the following members: A. L. Clayden, chairman; W. H. Allen, C. C. Carlton, J. E. Hale, B. Maraini and H. W. Waite.

The name of the Headlamp Glare Division has been changed to the Lighting Division. The personnel is as follows: W. E. McKechnie, chairman; P. F. Bauder and A. L. McMurtry.

K. W. Zimmerschied will be chairman of the Iron and Steel Division with the following members: R. R. Abbott, W. B. Hurley, F. E. McCleary, G. L. Norris, J. H. Parker, C. F. W. Rys, H. J. Stagg, Jr., and H. G. Stoddard.

The Miscellaneous Division will consist of the following: E. H. Ehrman, chairman; Clarence Carson, C. S. Crawford, J. E. Diamond, W. A. Frederick, W. H. Knowles, Berne Nadall, H. H. Newsom, and E. E. Sweet.

K. W. Zimmerschied is chairman of the Nomenclature Division, the other members consisting of H. E. Coffin and A. Ludlow Clayden.

C. W. McKinley is chairman of the Springs Division, the other members being C. E. Clemens, W. C. Keys, R. L. Morgan, W. M. Newkirk.

A division to be called the Starting Battery Division has been established. This will be constituted of car designers and engineers, representing battery makers.

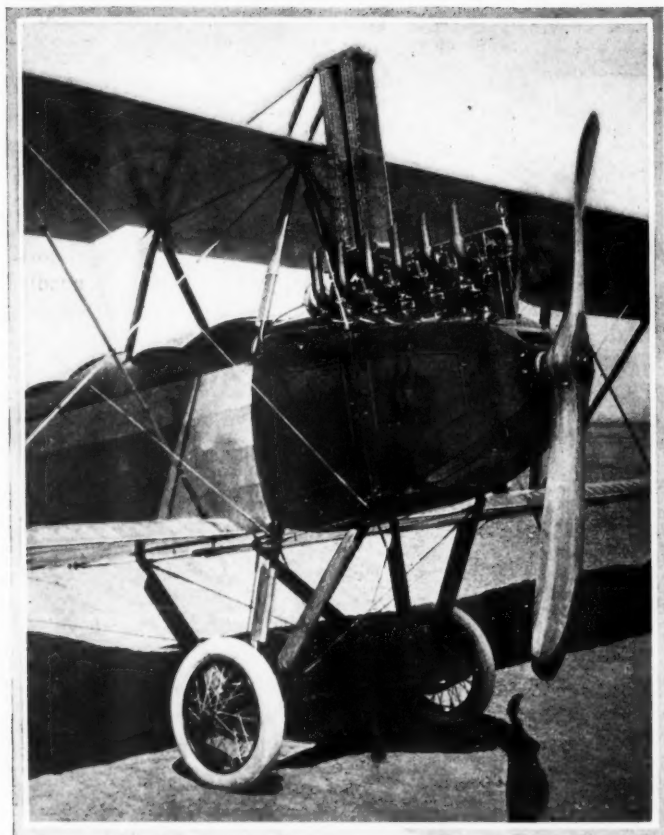
K. W. Zimmerschied is chairman of the Tire and Rim Division. The other members are as follows: W. H. Allen, E. K. Baker, C. C. Carlton, J. E. Hale, E. O. Heinsohn, J. C. Manternach, C. B. Whitely, J. E. Hulse and C. B. Williams.

H. D. Church is chairman of the Truck Standards Division. The other members are: B. B. Bachman, P. J. Batenburg, Wm. M. Britton, L. P. Kalb, W. T. Norton, Jr., A. L. Riker, W. R. Strickland, A. J. Scaife, G. W. Smith, F. A. Whitten and John Younger.

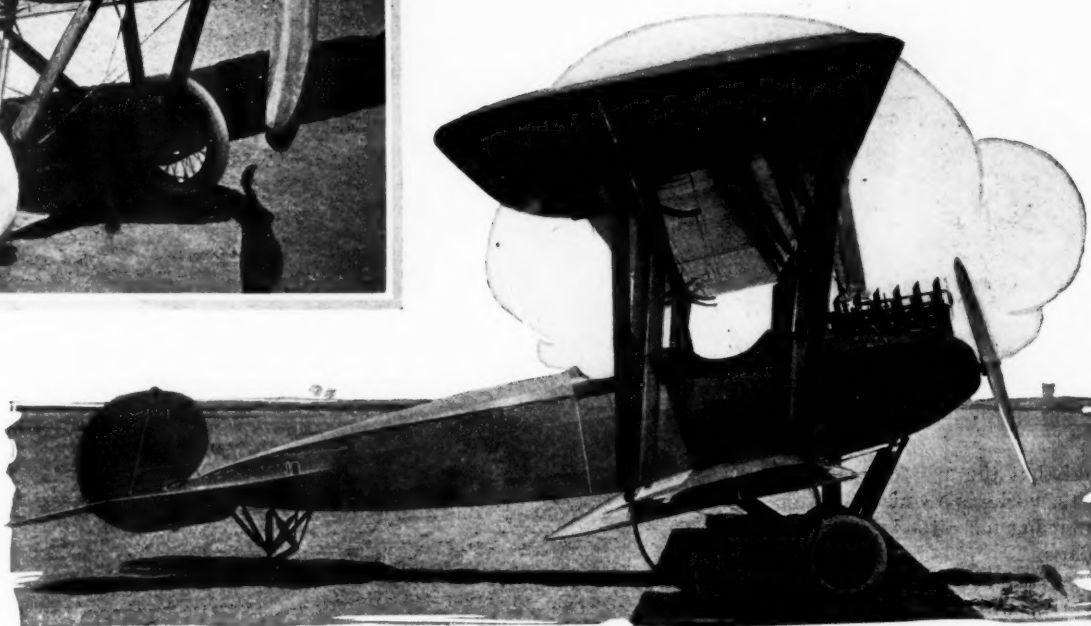
A Marine Division has been established. The members of this will be leading engineers engaged in the design and production of marine engines, hulls, reverse gears and propellers.

H. L. Horning will serve as chairman of a Tractor Division. The other members of this division will be announced at an early date.





The logical descendant of the original Wright aeroplane; the Wright-Martin biplane that will be at the aero show



## Hold First Aero Session

S. A. E. Expects Large Attendance at Aero Show Meeting—Finest Collection of Motors Ever Seen in Exhibition

THAT there will be huge crowds at the first national aeronautic exhibition, which opens at the Grand Central Palace to-day, Feb. 8, is a foregone conclusion. More than ever so perhaps, as a result of the past week's international developments. But while the big crowd will be formed largely of the idly curious, the show will be one of the most interesting exhibitions that engineers have ever been able to see.

The aeroplane, and particularly the aeroplane engine, is the most recent triumph of engineering skill, and the exhibition about to open will contain a greater variety of up-to-date engines than have ever before been gathered together for public view. Amongst them a majority are testimony to the skill of men who had their training in automobile work, and by far the most impressive and also the biggest of these motors come in the automobile engineering category.

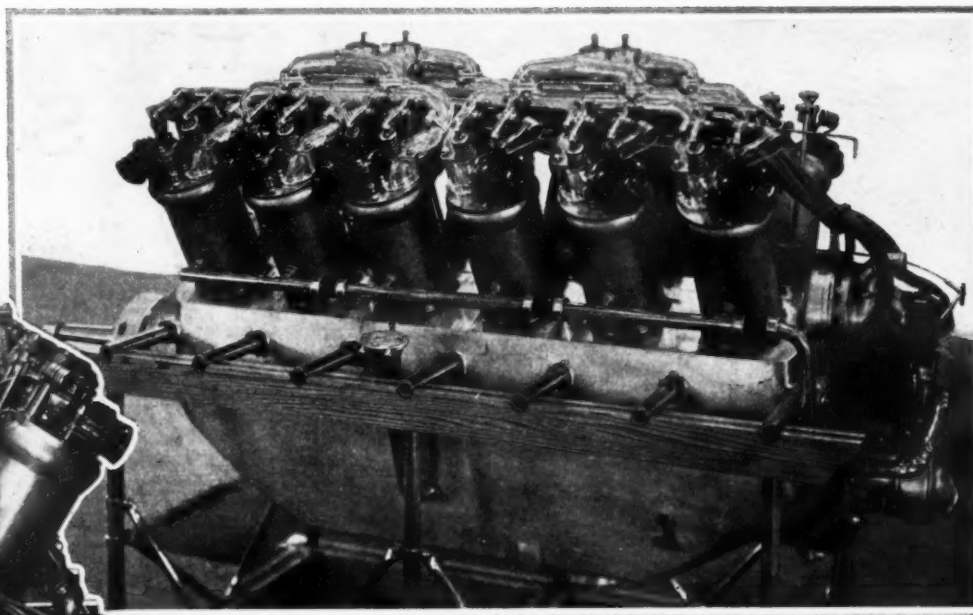
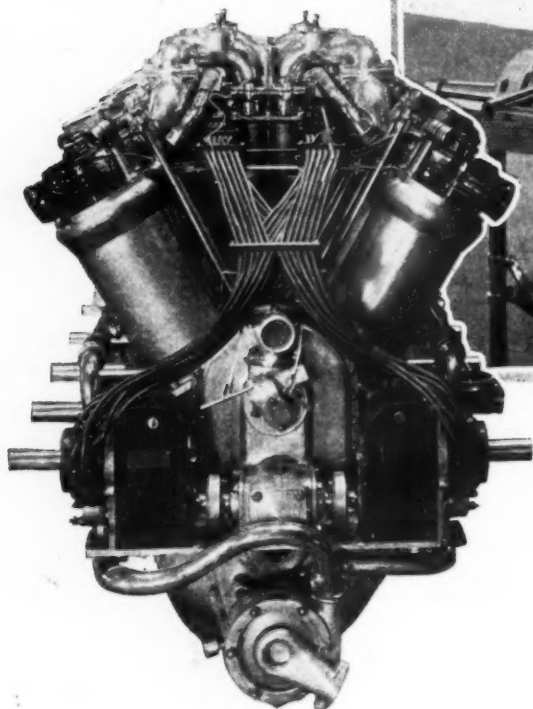
In Europe for a long time the idea persisted that the aviation engine needed to be something quite different from an automobile motor. It was thought that the high-speed type akin to the racing car engine could not be built so light for its power as some entirely original design; whence came the Gnome and a host of other engines. But since the war, when the aeroplane has been put to real work, it has transpired that the engine that is fundamentally a racing car motor, only larger and more expensively made, is giving far the best service.

An unexpected event has been the demand for engines of such large size. Three years ago 120 hp. was large, to-day we have to multiply this figure by three to be able to call an engine big. Horsepowers between 200 and 300 are the rule, and the cry of the military and naval users is for still more power. There is something stupendous in the idea of a twelve with a bore of 5 in. and stroke of 6 or 7 in revolving at 2000 r.p.m. or more, and to produce such engines even with racing car construction as a basis has not been easy. The difficulty is increased greatly by the need for low weight; it is stated on good authority that the European governments will not now consider any engine that scales more than 3 lb. per horsepower exclusive of water, but inclusive of carbureters and ignition. A weight of 3½ lb. is thought passable, but anything greater than this is said to be altogether too great for consideration.

### Limit of Cylinder Size

One of the things the engineers have soon to settle is the limit of cylinder size. Using high speed and high mean effective pressures, cooling the valves becomes a grave problem, and cooling the pistons is also a thing to be considered. To keep down valve temperatures more than two per cylinder can be used, even more than four if necessary, but the piston ultimately limits cylinder bore. Just at present the idea seems most prevalent that 5 in. is about the extreme limit,

The Curtiss twelve, which has been developed direct and not from automobile experience. Peculiarities are the valve layout and the bolted-on exhaust ports with their air-cooling fins. The method for supporting the crankcase in the plane is also unusual



and that the cry for more power will be met by more cylinders, perhaps 18 or 24, all on the same crankshaft, perhaps by using more than one engine for a plane.

At the one-day meeting of the S. A. E., which will be held Friday, Feb. 9, in the Engineering Societies Building, many problems such as those briefly outlined will be discussed, and the subject of engine construction will be introduced by Leigh M. Griffith in his paper on "High Pressure Aviation Engines." Griffith, who has had much invaluable experience in developing the Martin aviation motor, discusses the subject analytically, pointing out the fundamental differences between the old style of large, low pressure engines, and the modern type, and he shows very clearly how the high pressure design is able to be built lighter for its power. On the question of what is high pressure, Griffith puts the dividing line at 100 lb. brake mean effective pressure, classing all engines developing more than this as high pressure, but he hints that this figure may soon be exceeded. The limiting factors now, according to his paper, are valves and spark plugs, particularly the latter, which still give frequent trouble.

A very important point, he says, is the form of construction adopted for the cylinders, as they compose a large part of the weight of the engine, have a considerable stress to bear, and the valve and spark plug troubles are greatly aggravated by too great a thickness of cylinder metal in their vicinity. He reviews the different types of cylinder as follows:

"The best method is to diminish the thickness, or rather the thermal resistance, of the walls somewhat in inverse proportion to the increase of unit heat-conduction capacity required. Such a method, however, involves the use of a higher grade of material for the cylinder walls and demands a greater attention to the problem of allowing the cylinder walls the greatest amount of freedom to expand in all directions under the influence of heat so that the minimum restraint is offered to such movement. It is this restraint that distorts the walls from their original form. It is also necessary to insure a more uniform cooling action of the circulating water.

#### Steel Cylinders

"The use of automobile-type cast-iron cylinders for aviation engines, with either integral or applied jackets, is gradually but surely disappearing, for reasons that are well understood. Just now, the popular tendency is to use some form of cast aluminum-alloy cylinder with either a steel or cast-iron liner. This general type of construction is appearing in the individual as well as the block-cylinder form, but it seems to the author to be poorly adapted to the requirements of the really high pressure engine because of the unavoidable fact that the total resistance to the conduction of heat through the walls is greatly increased by the lack of continuity of metal at the joint between the liner and aluminum wall, and also by the considerably increased total thickness of metal. It certainly appears that lubrication is rendered more

### PROGRAM

#### First Aeronautic Session

Society of Automotive Engineers

Engineering Societies Building  
29 West 39th Street

NEW YORK, Feb. 9, 1917.

#### AFTERNOON STANDARDIZATION SESSION 3 p. m.

Henry Souther, Chairman aeronautic engine division, standards committee, presiding.

Necessity of Standardization of Small Metal Parts for Aeronautic Use—  
F. G. Diffin.

Suggestions for Standard Tests of Aeroplanes—J. J. Rooney

#### EVENING PROFESSIONAL SESSION 7.30 p. m.

Vice-president Charles M. Manly, presiding

7.30 to 8.15—Motion pictures of aircraft in flight

8.15—Aerial Navigation Over Water—  
Elmer A. Sperry

9.15—The Evolution of Aeroplane Wing Trussing—Professor F. W. Pawlowski of the University of Michigan.

10—Notes on High Pressure Aviation Engines—Leigh M. Griffith.

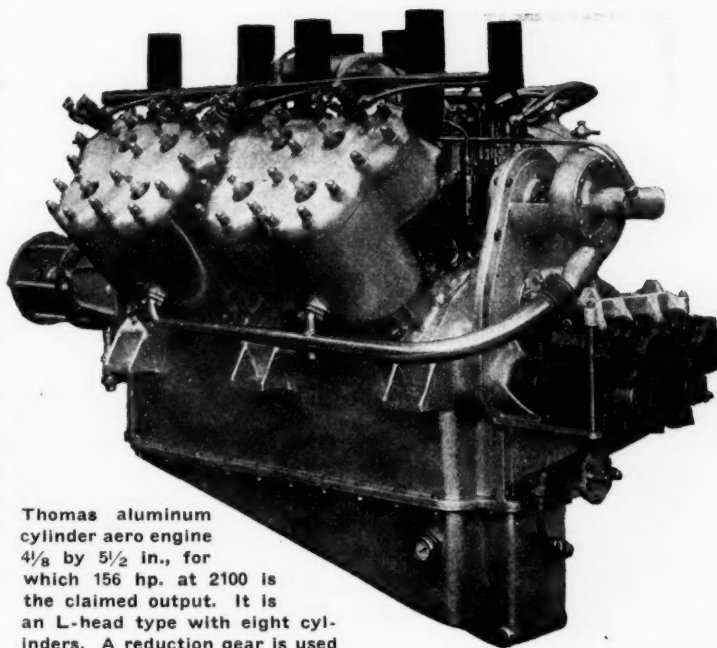


difficult by this construction and the risk of pre-ignition increased from the same cause.

"A better arrangement, from the heat-disposal and weight standpoints at least, is that wherein the jacket water comes in direct contact with the steel liner. In the latter case, the liner can be screwed into the combustion chamber at its upper end so that the combustion chamber is a part of the aluminum block casting, or the liner can have a closed head-end forming the combustion chamber and with the valves seating directly on the liner material.

"The ideal cylinder has the thinnest possible wall consistent with the maintenance of a satisfactory degree of rigidity; is so designed as to permit the greatest freedom of expansion and contraction under the influence of temperature changes; has uniform wall thickness throughout; and is provided with a water jacket of such design as to give a uniform cooling action over all parts of the cylinder wall. The basic idea is to make sure that each unit of area of heated surface of the combustion chamber and cylinder wall is separated from a like unit of area of uniformly cooled surface by a wall of minimum uniform thermal resistance. Of course, in the case of the piston and valve heads this cannot be done, since these members have to conduct the heat received largely to their surfaces of contact with the cylinder metal, in order to transfer it to the cooling water. In the piston, this is best accomplished by using a metal of high conductivity and a design that provides ample sectional area to conduct properly the heat from the head to the skirt, from which it passes through the oil film to the cylinder wall.

"It seems to the author that there can be but little question as to the one best cylinder construction for the aeronautic engine working under the highest brake mean effective pressure. It is that in which the cylinder units are built up in pairs or blocks from alloy steel parts flame-welded together into one integral whole. A number of advantages are inherent to this form of construction, such as the following: The absolute minimum thickness of metal is required to resist the stresses due to the pressure and thermal effects, which makes for light weight; the minimum thickness of metal wall interposed between the hot gases and the jacket water and the absence of masses of metal tending to accumulate heat make for uniform and effective cooling of all



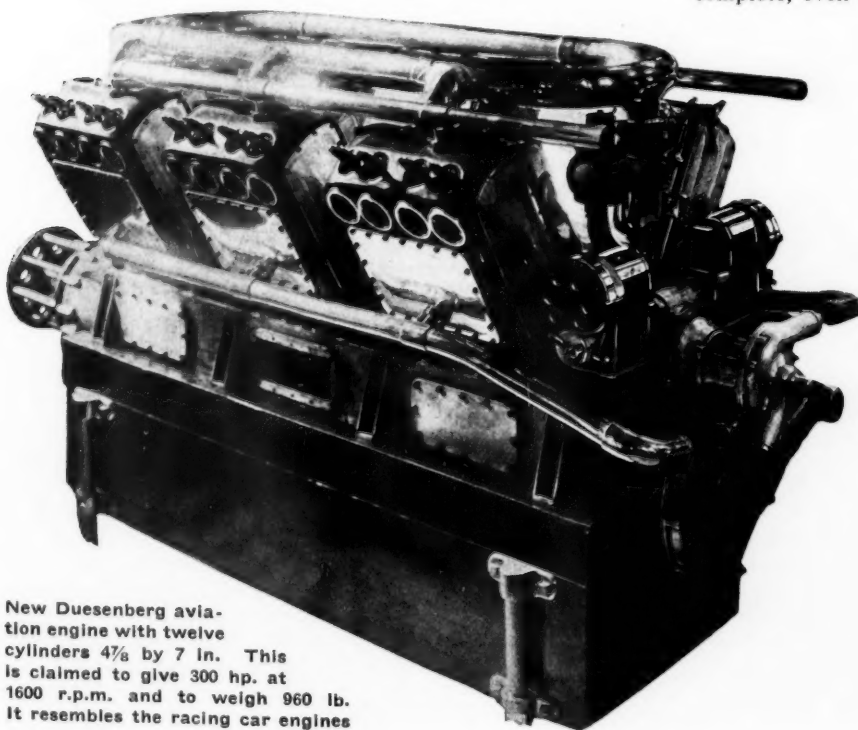
Thomas aluminum cylinder aero engine  $4\frac{1}{8}$  by  $5\frac{1}{2}$  in., for which 156 hp. at 2100 is the claimed output. It is an L-head type with eight cylinders. A reduction gear is used

interior surfaces by water of fairly high temperature; assurance of the homogeneity and character of the material composing the cylinder elements; a definite knowledge of the form and thickness of all walls; the greatest facility of inspection and testing of all joints during the assembling operations—all of these make unnecessary any arbitrary addition of metal in the endeavor to allow for possible unknown weaknesses.

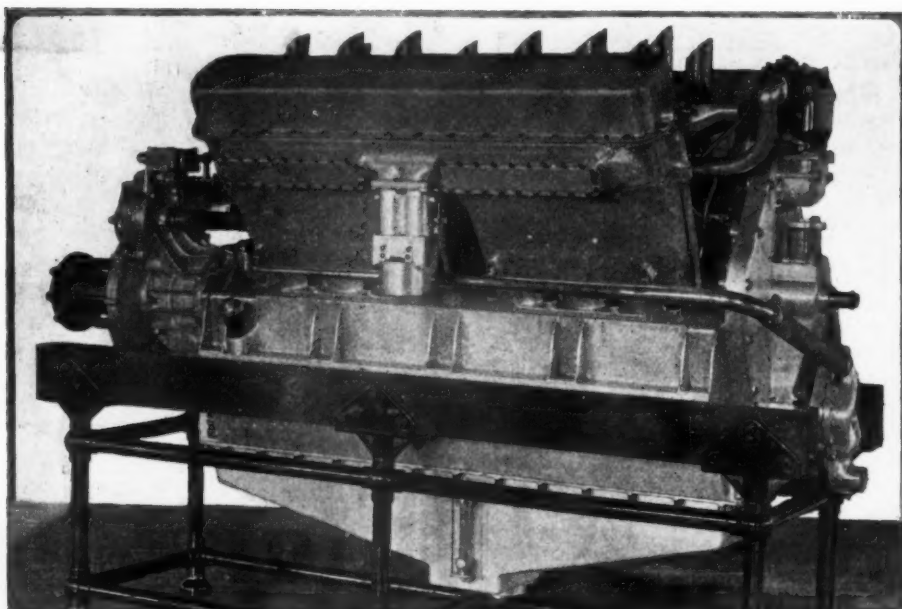
"The author has built  $4\frac{1}{8}$  by 7-in. cylinders by this method, of nickel and carbon steels, in pairs, that weighed only 24 lb. per pair, or 9.8 cu. in. displacement per pound of weight. These cylinders are on an engine that on official test showed a brake mean effective pressure of over 116 lb. per square inch, which is believed to constitute a record for aeronautic engines. The hydrostatic test-pressure for inspection was 1000 lb. per square inch. The cylinders were provided with four valves and two spark-plugs each. The jacketing was complete, even extending to the inlet and exhaust flanges as well as completely around the valve-seats and plug bosses. The fact that these light cylinders stood the high temperature and pressure without distress or heating troubles certainly proves that it is absolutely unnecessary to adopt a heavy construction for these conditions.

"In comparison, it may be stated that the  $4\frac{1}{8}$  by 7-in. cast semi-steel cylinders of a recently announced aeronautic engine weigh 51 lb. per pair, or 5.1 cu. in. displacement per pound, without the cast aluminum covers that close the jacket spaces; and this is only a two-valve engine. Another airplane engine, also recently announced, has built-up steel cylinders with cast aluminum jacket covers; the 4 by 6-in. cylinders weigh 40 lb. per block of three, or 5.65 cu. in. displacement per pound. This is also a two-valve design, and both descriptions have recently appeared in the technical magazines."

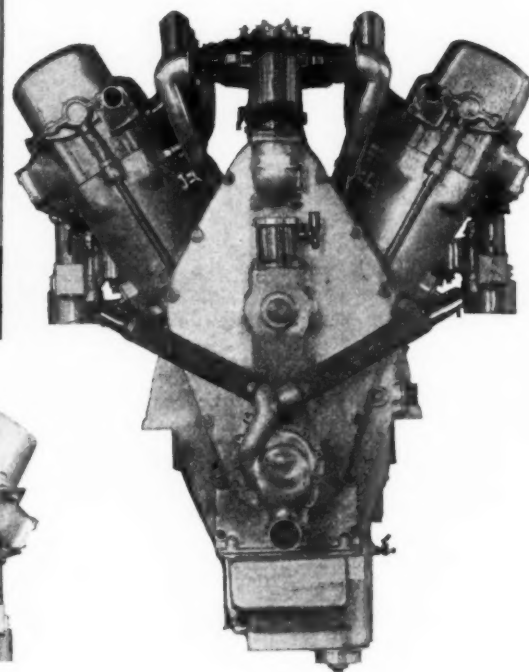
Although preferring the steel cylinder, Griffith believes aluminum to be the best piston material both on account of its light weight and of its better heat conducting properties, but particularly on account of



New Duesenberg aviation engine with twelve cylinders  $4\frac{1}{8}$  by 7 in. This is claimed to give 300 hp. at 1600 r.p.m. and to weigh 960 lb. It resembles the racing car engines



Knox aviation engine,  $4\frac{3}{4}$  by 7 in., twelve cylinders. This has aluminum cylinders with cast iron liners and the camshafts are arranged overhead, operating the valves through rockers. Very high pressure oil is used, running up to 70 lb. per square inch, and the camshafts are pressure lubricated as well as the crankshaft bearings.

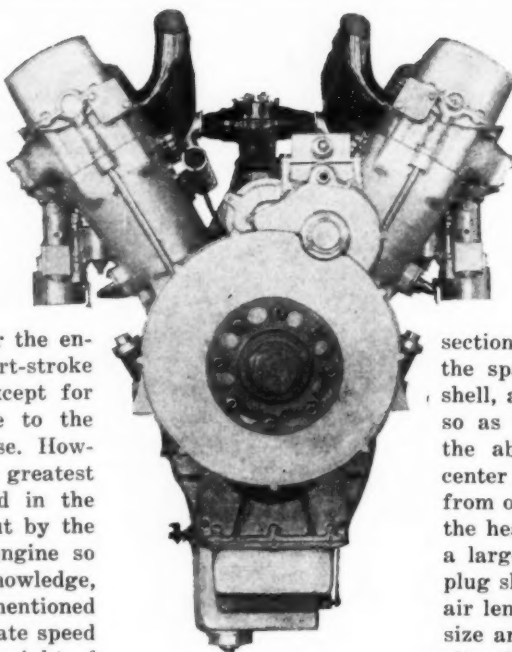


the latter. In regard to this the paper states:

"Attention has been previously called to the increased intensity of heat absorption in the case of the high pressure unit, but this is almost offset in the case of the piston by the reduced diameter and consequently reduced distance for the heat to travel."

Insofar as its effect on the type of cylinder construction employed is concerned, it matters little whether the engine is laid out as a geared-down short-stroke job or a direct-drive long-stroke, except for the comparatively slight saving due to the shortened barrel length in the first case. However, the author is convinced that the greatest power-weight ration can be obtained in the direct-driven engine; this is borne out by the fact that the lightest water-cooled engine so far officially tested, to the author's knowledge, is the one incorporating the above-mentioned light weight cylinders. At the moderate speed of 1325 r.p.m. this engine showed a weight of only 2.65 lb. per brake horsepower; this weight included the two magnetos complete with all wiring and plugs, the two carbureters and manifolds, all water headers and a particularly powerful pump. However, it did not include the weight of the propeller-hub, starting-crank, exhaust headers, or the contained water and oil. It would seem as if the most simple and direct method to obtain a sufficiently high piston speed in combination with a propeller speed that will come within the zone of high propeller efficiency is to adhere to the long-stroke direct-driven design in which the propeller is carried on an extension of the crankshaft. Certain it is that the total inertia forces of the reciprocating parts for this method are less by a considerable amount than those in the shorter-stroke geared-down engine.

Spark plugs are perhaps the greatest source of trouble in the high pressure engine. If the threaded portion of the shell makes good contact with a well-cooled surface, no trouble is to be expected from the shell itself over-heating. However, the grounded electrode must be of sufficiently high heat conductivity and must have a sufficiently good thermal contact with the shell to insure that the heat received will be carried to the shell and then to the jacket water. The



section of these electrodes should increase from the sparking point to their anchorage in the shell, and should not be flattened or deformed so as to offer a relatively large surface for the absorption of heat from the gas. The center electrode usually gives the most trouble from overheating. This is to be expected since the heat received by it has to be conducted in a large measure through the insulator to the plug shell. Very little heat is conducted to the air lengthwise of the stem, owing to the small size and length of this member. Perhaps this situation can be helped by the development of an insulating material having a higher heat conductivity in proportion to its electrical conductivity than the materials now in use. The greatest improvement is to be looked for along the lines of electrodes with higher heat conductivity, greater sectional area, and perhaps thinner insulators having more intimate contact with both the electrode and shell. The recent idea of introducing a small amount of air or mixture direct to the plug cavity, in such a manner that it washes both the center electrode and insulator, may prove to be a considerable aid.

In an engine developing a high mean effective pressure, necessarily a high volumetric efficiency and a high compression pressure are required; these in turn demand efficient cooling, scavenging, charging and ignition. The cooling requirements have been mentioned and consist fundamentally of the uniformly energetic circulation of the cooling water over a cylinder wall of the highest possible uniform thermal conductivity.

Of the other papers to be presented, in accordance with the program on page 326, Sperry's on aerial navigation over water is devoted largely to a description of his automatic controls for aeroplanes, and the gyro compass.

pg. 364



# Modernized Marine Engines

Automobile Type of Design Gains—Eight Cylinders in Line Favored for Large Units—Large Aluminum Pistons

**N**EVER has there been a motor boat show containing so many engines of the automobile type, or so interesting a collection of engines as were seen at the exhibition in the Grand Central Palace that has just closed. Foremost among the names familiar to the automobile engineer, Wisconsin and Duesenberg had large exhibits, the latter showing the aviation twelve, which is the latest product. Curtiss had a couple of aviation engines, a small eight and a large twelve, there was a new boat engine, the Lacy, which is a large edition of the motor fitted to the Cunningham car, and the older boat engine builders, such as the Sterling Engine Co. and others, had engines more than ever like the modern automobile motor.

## Big Change in Year

Quite a big change is to be noted since the show of a year ago, as the new engines for 1917 are more compact and apparently smaller for their power. Not only is this so of the big power plants, but the smaller boats evidence a tendency to be fitted with regular four cylinder automobile engines rather than with two-stroke types or the three-cylinder gas engine style that has been very popular. At the other end of the scale the heavy oil engine for commercial craft of the hot bulb or so-called semi-Diesel type is getting neater, though its slow combustion precludes the use of high speed.

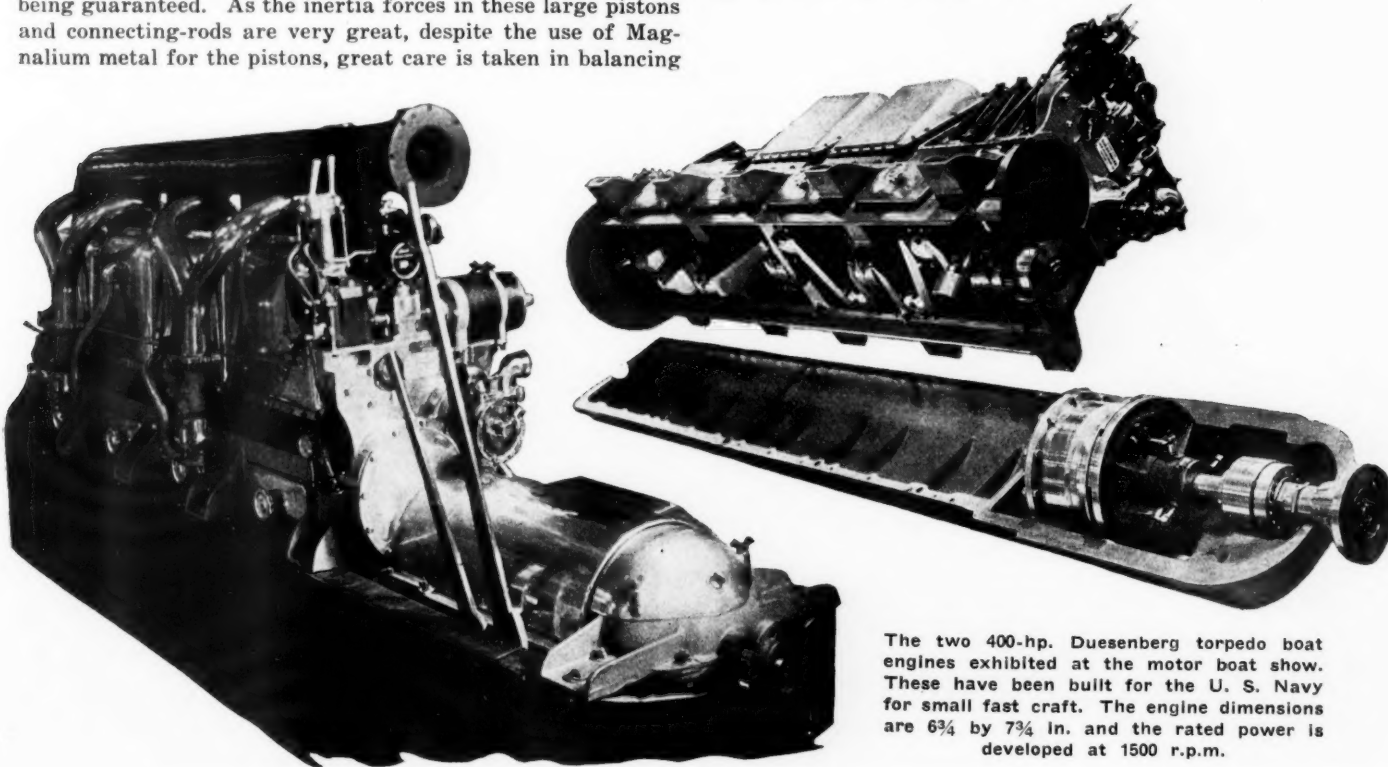
Of all the engines on the floor there was none more interesting than the big Duesenberg built for a U. S. small torpedo boat. This, as the illustrations show, is similar in principle to the Duesenberg racing car engine, having the same valve layout and the same rocker operation. The cylinder dimensions are 6¾ by 7¾ in. and the rated power is 275 at 1000 r.p.m. and 400 at 1500 r.p.m. the delivery of this rated output being guaranteed. As the inertia forces in these large pistons and connecting-rods are very great, despite the use of Magnalium metal for the pistons, great care is taken in balancing

by keeping the reciprocating weights for each cylinder close to a fixed amount and allowing very little tolerance. There is a very elaborate pressure lubricating system, feeding every part, even to the rocker arms, and splash can be used in addition if desired. There are two oil pumps, one feeding the pressure lines and the other for the purpose of exhausting the crankcase to a level that can be controlled at will. Oil taken from the engine is pumped to a main supply tank in the engine room, whence the pressure pump obtains its supply, the idea being that the body of oil required to insure a sufficient supply of cool lubricant is too great to be carried in the crankcase.

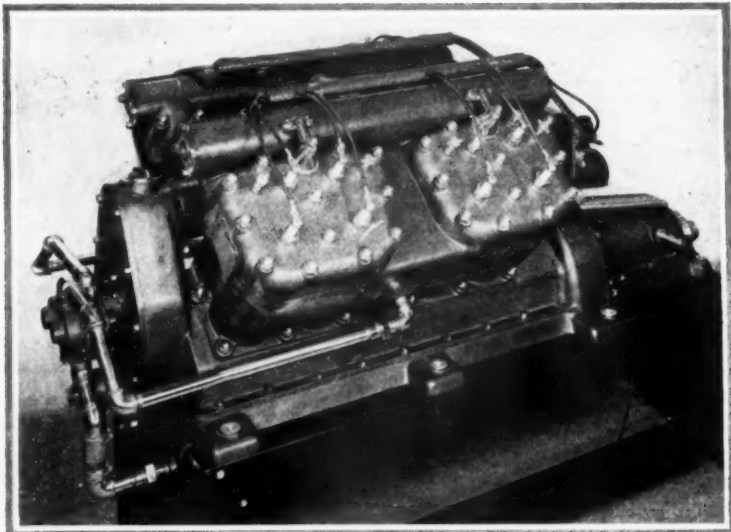
For the crankshaft a hammer forging is used of alloy steel and the camshaft is a drop forging with integral cams. Semi-steel castings are used for the crankcase, and these are heavily ribbed to give the requisite rigidity.

For ignition there are two systems, magneto and battery, and a starting and lighting outfit of regular automobile type is provided. The engine has a Bendix engagement and appears wonderfully small for the job of cranking such an immense engine. It is interesting to note that the price of the complete plant is \$5,500.

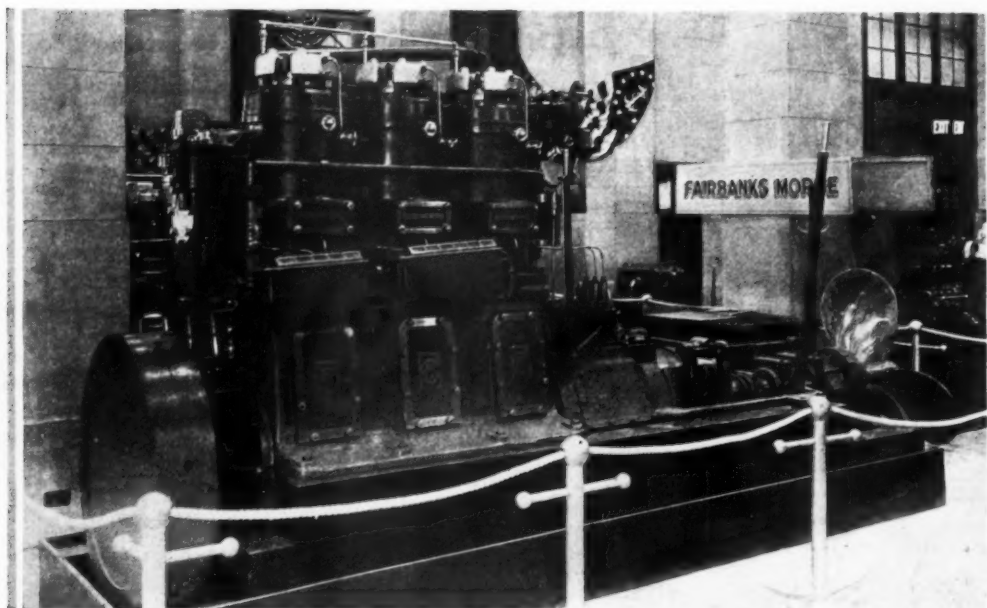
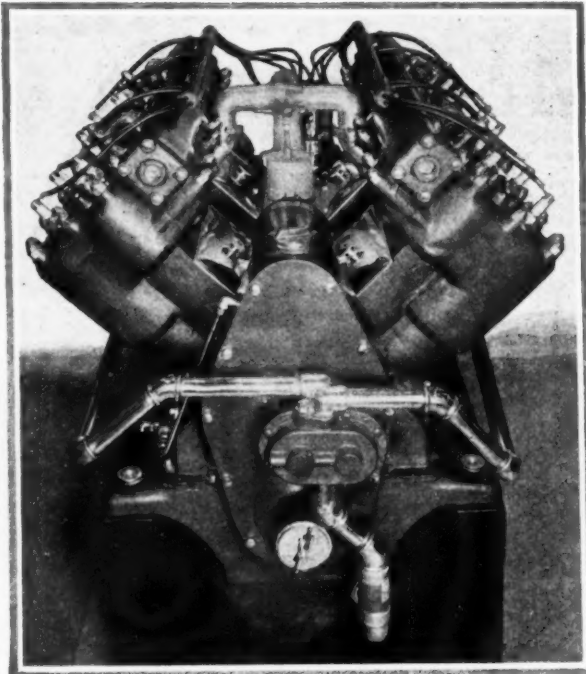
It is noticeable that the boat engine is often built as a V motor, probably because narrowness is a quality in high-speed boats, especially where two engines are used. For one engine, however, the V type has advantages and the latest addition to the ranks of boat motors is the Lacy shown opposite, it being designed by the originator of the Cunningham car eight-cylinder engine, new a year ago. This is being made in two sizes, both with eight cylinders; the smaller is 4¾ by 6 in. and the larger 5¾ by 6½ in. The two engines are rated at 100 and 200 hp., respectively.



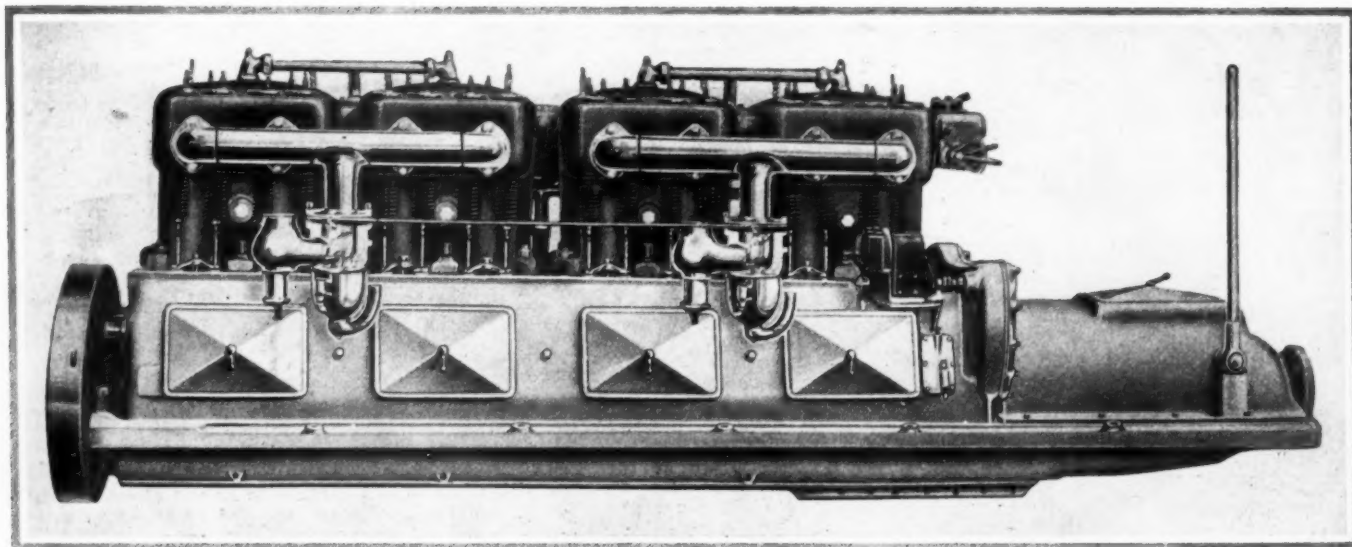
The two 400-hp. Duesenberg torpedo boat engines exhibited at the motor boat show. These have been built for the U. S. Navy for small fast craft. The engine dimensions are 6¾ by 7¾ in. and the rated power is developed at 1500 r.p.m.



The Lacy eights for marine work are closely similar to the engine of the Cunningham car. Two sizes are being made,  $4\frac{1}{4}$  by 6 in. and  $5\frac{3}{4}$  by  $6\frac{1}{2}$  in. Cold water is drawn through the crankcase on its way to the pump before going to the cylinders, this being for the purpose of cooling the oil.



The Fairbanks-Morse engine on the left is a hot bulb or semi-Diesel type operating on heavy fuel. Below is the newest Sterling engine intended for fast cruising boats. This has cylinders  $6\frac{3}{4}$  by 9 in. and gives 300 hp. at 1000 r.p.m. It is a heavily built engine weighing over 5000 lb. and is frequently used in sets of two or three for twin and triple screw applications. The engine has an electric starter and the fuel used is gasoline.





# MANUFACTURERS' Manufacturer to Distributor Dealer, Buyer MERCHANDISING

*First Article of  
a New Series to  
Appear Weekly*

## How Saxon, Paige and Mitchell Grasped Business Opportunities of Show Week Dealer-Dinners at Chicago

**T**AKING advantage of the Chicago automobile show has yet to be learned by several automobile makers. True, they show their cars and meet a lot of dealers, but do not put over the selling arguments and business talks with their dealers that they have good opportunity to do. Several makers give a so-called dealers' dinner at noon or at night. Some have several hundred present, and after the dinner there is a movie reel, a few songs, a few stories and then adjournment.

They are not all like this. A few at least have got a gage on Chicago show value and away last fall set out to cash in on it as well as on the New York show. Compared with a year ago, last week at the show gave evidence of big improvement. There were two or three dinners for dealers on a higher plane than any previous ones. Several other makers showed creditable improvement over their efforts last year, but opportunity remains for much yet to be done.

Three of the best dealers' dinners given last week were Saxon, Mitchell and Paige. Each filled a peculiar field. Mitchell had a salesman talk with a movie reel or two assisting the lecturer, and Saxon had not a selling talk, but a better business talk with movie and still pictures to help it out. Each was specially good in its field. Each impressed all dealers assembled that the factory meant business and that there was business, and business only, back of the factory selling method of Mitchell, and that business permeated every phase of the Saxon organization.

### **Saxon Dealers Learn Factory Problems**

The Saxon talk by President Harry Ford was the best one of the kind during show week. It was a business talk he had been preparing for weeks. The pictures were well selected and the talk delved into a dozen factory problems.

No. 1—Mr. Ford told dealers what it cost his factory because of poor business methods of some dealers. One Saxon dealer could not be made to answer letters. The company wrote him for 30 months with no results, and finally Mr. Ford sent him a personal telegram which brought a reply. The bad business of this dealer cost the Saxon factory \$8.

No. 2—Mr. Ford explained that the labor turnover in the Detroit automobile factories is 1100 per cent per year. That is, to keep a force of 100 men for a year requires hiring 1100 men, which is a terrific expense to any factory. He then told how the Saxon labor turnover is only 207 per cent; in other words,

for every 100 men the Saxon company keeps from year to year it requires hiring 207 men. This is a very favorable showing compared with the Detroit factory average. You have not to go around the corner and ask the man you want to explain how such an example hit the Saxon dealers. Their applause showed they caught the idea and read into the talk the fact that it costs Saxon less to maintain its factory force than it does certain other Detroit factories, that because of this the car can be made better at a lower cost, and that they as dealers are getting more for their money than if the labor turnover percentage were 1000 per cent or higher.

### **Dealers Must Improve Letters**

No. 3—Dealers were reprimanded for poor letter writing, and incidentally told indirectly that when they cannot write a plain understandable business letter it is more than certain that they cannot handle a business much better. A letter of complaint from one dealer, which was shown on the screen, showed that the dealer dictated a three-quarter page letter and yet failed to state a single trouble he had. He apparently forgot that in the effort of dictating the letter. Mr. Ford told the dealers how to write complaint letters: First to state specifically the real trouble, second to state if the trouble happened during shipment, and third to state if the trouble had apparently happened before the car left the factory. From this date forward the several hundred Saxon dealers at the dinner will send in proper complaint letters.

No. 4—Such a meeting afforded an excellent opportunity to tell dealers about the good qualities of the car. To do this several inspection reports were thrown on the screen. One showed the chemical report of steel analysis; another showed the physical test of certain parts; others were inspection reports covering accuracy of manufacture; and finally, to clinch the argument, the speaker told of the mass of parts rejected and then had projected on the screen pictures showing stacks of rejected parts, including nearly everything in the car. From several tables came the remark, "I never thought they were so careful." The argument struck home. It made them all better Saxon dealers.

### **How to Write Complaints**

No. 5—One letter on the screen told of a complaint about shipping only two Saxons in each railroad car,

whereas the factory had agreed with the dealer in question to ship three. As a result of shipping only two in each railroad car it was costing the dealer over \$8 per car more than formerly. The dealer had been told of the reason, but the lesson was driven home to all at the dinner when two diagrams of railroad cars were thrown side by side on the screen. One showed how it was utterly impossible to put three Saxons in each freight car, and the answer was that they had to take whatever freight cars they could get and the ones they were getting were several feet shorter than the regular ones. It did not call for a long argument to tell the dealers that it was better business for them to get two cars on time, if at a little higher cost, than not to get any. The argument was a bull's-eye.

#### *Realizing Sales Opportunities*

No. 6—Two stormy-day pictures thrown on the screen drove home a good selling argument with every dealer. One picture showed a salesman looking out of the salesroom window at the driving snowstorm. The dealer was thinking to himself, "No use of stirring out, nobody wants to buy a car to-day, I might as well go home." The next picture was the complement of the salesman. It showed a business man just up from the breakfast table on the same stormy day. He was looking out of the window at the blinding snowstorm and was contemplating: "I certainly wish I had taken that salesman's advice and bought that sedan car 6 weeks ago. He told me how fine it would be on such mornings as this. To-day it will certainly be unpleasant waiting on the corner for the street car and then getting into an ill-smelling car filled to the doors." No further comment was necessary. It was a home-run sermon on stormy-day salesmanship.

#### *Must Read Circular Letters*

No. 7—Red blood was even put into the circular-letter argument. This is how President Ford put it: "You dealers must read circular letters. These letters make it possible for us to give greater value for less money in every Saxon car. If we sent you all individual letters we would have to employ many more stenographers. Years ago the business man wrote individual letters, wrote them in long hand. To-day with special automatic typewriters or by duplicating machines thousands of circular letters are sent out in a few hours. They are amazingly cheaper. The dealer must receive a circular letter from his factory in the spirit of factory co-operation and good business economy. We sent you a circular letter telling about increases in demurrage rates. That letter was just as carefully written, a little more so, than if we had dictated an individual one to each of our hundreds of dealers." The argument went home.

No. 8—All factory heads were introduced by having the pictures shown on the screen, followed by another screen giving a brief typewritten outline of where each had worked and the experience he had. These little biographies got under the skin of the dealer. They told how one department head had for 5 years been assistant department head in one of Detroit's largest factories and previous to that had been with a large railroad or engineering house. These biographies were three-base hits. All around were heard

remarks: "He's a good man," "Where did they get so many men with such good experience," etc. Here, without the speaker uttering a single word, all of the dealers present were being convinced of what real brains there are in the Saxon factory.

#### *Five Essentials for Saxon Dealers*

No. 9 and Last—One screen told of the five essentials that the Saxon factory expected in every dealer. They are:

- a—A good store.
- b—A good service station.
- c—Persistent local advertising.
- d—Good salesmanship.
- e—Good co-operation in every detail of the work.

Each of these was amplified and good arguments handed from a maker to a dealer.

President Ford introduced something good when he adopted the plan of projecting on the screen short paragraphs instead of telling the dealers the same thoughts. By putting them on the screen it made every dealer read every word. Generally they got more out of the paragraphs than if they had just listened to them. There was much novelty in the scheme. The novelty attracted the dealers, but the plan went still further and drove the argument home much better than if all the words had been spoken.

#### *Mitchell Merchandising Methods*

George Hipple, merchandising expert of the Mitchell company, gave one of the best car selling talks heard for some time at a dealers' noon-day dinner. He synchronized everything he said with a series of movie reels. The movie showed Hipple selling a car to a customer in a salesroom. In making the sale he showed him every detail of the car and as the movie showed Hipple pointing to the handle at the end of the windshield or any other part, Hipple in person was talking the very argument to the audience of several hundred dealers. He went through about fifty or sixty car-selling arguments in this way.

For example: He told of the cantilever rear springs and then got into the car to show the spring action, and before doing so located the buyer so that he could see every movement of the spring, which, by the way, was admirably brought out on the screen.

Further: Hipple went through the car from A to Z in this thorough way, and his selling arguments were so well worded and so brief and to the point that from start to finish he did not hesitate, did not misuse a word and did not repeat or wander from the point. The whole conversation was an example par excellence to all dealers on knowing their selling arguments backward.

#### *Emphasizes Thorough Selling Policy*

It could not but impress every dealer with the thoroughness of the Mitchell selling policy. It took time and money to get up such a reel and every dealer went away conscious of the fact that Mitchell was expecting him to be a better salesman in 1917 than he had been in 1916. He went away feeling that he must brush up his selling arguments, and that if he does not make good this year he will stand a good chance of losing the agency before 1918. The talk from start to finish showed that the Mitchell company



means business in selling cars. It showed that the Mitchell company expects its dealers to sell cars on a business basis.

You were particularly convinced of the fact that Mitchell dealers left that luncheon with a much higher estimate of the Mitchell company than that with which they arrived. They could not do otherwise. That is one proof of a successful dinner, and Mitchell's was a genuine success.

#### *Paige Has Real Business Talk*

Paige has improved its dealers' talk wonderfully over a year ago. Last season the talk had many good features, particularly the movie of the factory assembly system. But then the talk was a little below par and this year it is just as much above par. This year's talk makes no mention of competitors, but gets down to the business of selling Paige cars, telling how it can be done. The talk carries all through it the sentiment of better dealers. Dealers must handle their business on a better basis. There must be better bookkeeping systems, a better understanding of overhead costs, better understanding of what it really costs to sell a car, and a better knowledge of the scientific principles of salesmanship.

These are days when automobile makers must look more and more to their dealers. These are days when

the business factory is getting better dealers and dropping its weaker ones. There is not a factory that can afford to let the Chicago, New York, Minneapolis, Kansas City, Boston and a few other shows pass without carrying to their dealers the message of higher business standards.

Better merchandising is the work of many factories. The work of a factory does not end with the production of the car and the signing of the dealers' contract. It goes further. The dealer is the come-between, the connecting link between maker and buyer. The dealer should breathe the policy of the factory. If he does not then the spirit of the factory never reaches the buyer.

#### *Must Look to Dealers*

This is why some cars are strong in certain cities and deplorably weak in others. You know a car that is strong in Minneapolis and hopelessly weak in Kansas City. The reason rests with the dealer. One dealer has the spirit of the factory. The other has not. If you are weak in Denver lay the fault at your door and not at the dealer's. It may be the dealer has never got warmed up with the factory principles, the factory arguments, the factory methods. It is up to you to get them into his head. Do so by these show dinners.

## New Oakes Plant Improves Shipping Facilities

**B**BETTER shipping facilities characterize the new plant of the Oakes Co., Indianapolis. The factory has its own belt line switch connecting with twenty-one railroads. It is within two blocks of a freight station and is located on the main line of the New York Central.

The Beartone fan-horn, the combination license bracket, crank support, car lock for Fords and Kranklock are made in buildings which are constructed entirely of reinforced concrete. The factories are thoroughly modern in every way with large windows and improved machinery for every operation.

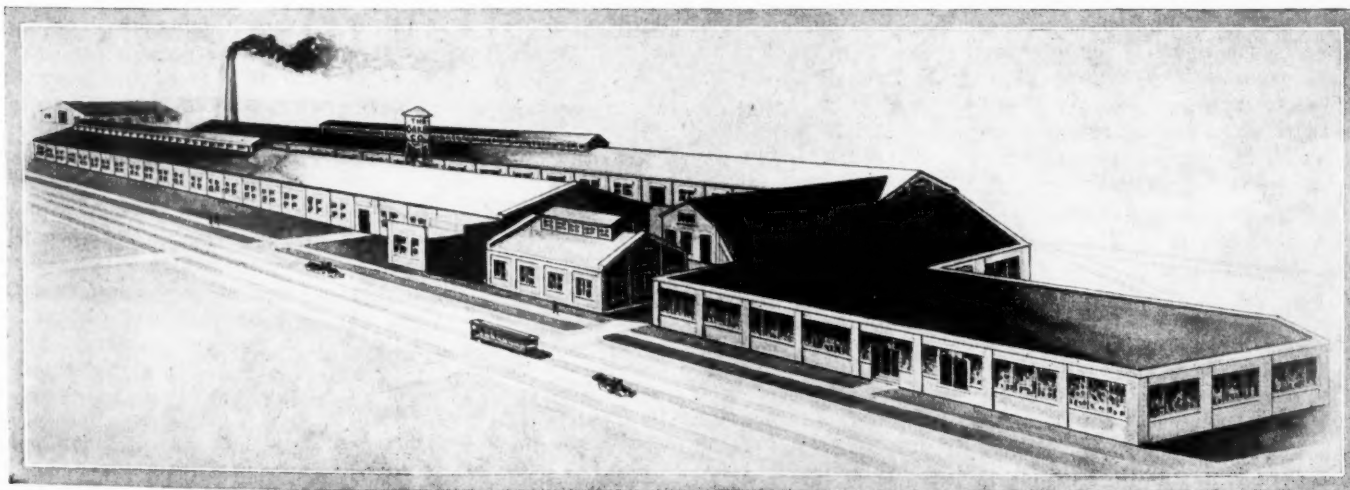
In the front of the longest of the new buildings are the general offices. New quarters are also provided for the testing and engineering departments. Completely equipped locker rooms where the employees may have adequate room for the changing and keeping of clothing are among the many improvements.

In the metal stamping department in which pressed steel of all kinds is manufactured, additional machinery has been placed so that heavier parts may be stamped than has been possible in the past.

This development has not been along the line of intensive improvement alone, but also in actual extent. The factory space has been doubled in size, the older building being renovated to furnish accommodations similar to the newer parts of the plant.

The Oakes factory is following a line which has met the constantly growing approval of manufacturers in the past twenty years, namely that it pays in every way to have the best equipment. Well ventilated factories with large windows and providing every convenience for the worker are not only more comfortable, but also show better profits.

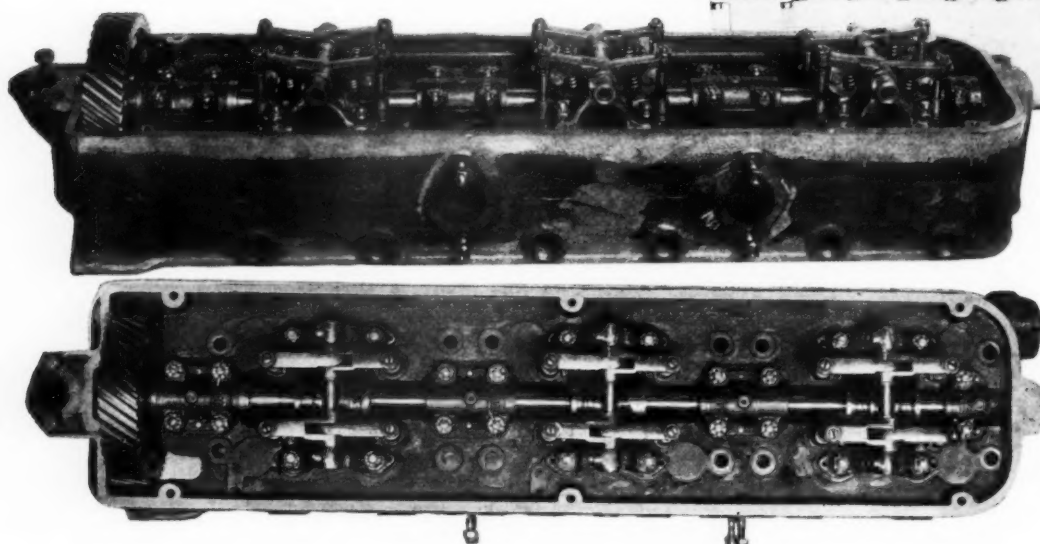
The Oakes Co. now makes radiator cooling fans for 175 makes of cars.



New plant of the Oakes Co., Indianapolis, which has private belt line switch connecting with twenty-one railroads

## No Valve Springs in Amalgamated Light Six

Valves Are Operated Positively  
for Both Opening and Closing  
—Engine is  $3\frac{1}{4}$  by  $4\frac{1}{2}$  In.



Amalgamated Light Six  $3\frac{1}{4}$  by  $4\frac{1}{2}$  in. with positively - operated valves. The two views of the head show the general layout of the valves and also the trough oiling arrangement employed

IT was announced in THE AUTOMOBILE for Jan. 18 that the Amalgamated Machinery Corp., Chicago, a concern created for the manufacture of munitions, would shortly produce a new stock engine. This was announced during the Chicago show and has a special feature in that the valves are operated positively both for opening and closing, there being no valve springs in the ordinary sense.

### Mechanically Closed Valves

The valves are ordinary poppet valves and are set vertically in a detachable cylinder head. They are arranged in two rows, the intakes on one side and the exhausts on the other, and down the center of the head is the camshaft, this lying between the valve stems. Between each pair of cylinders is a short rocker shaft which is placed transversely across the cylinder head, and there are fore and aft rockers to operate the valves. Each rocker is L shaped, one end being attached to the valve and the other carrying a roller, and the roller fits in a groove cut in a block attached to the camshaft. This groove is of such formation that the camshaft turns the roller, and so the rocker is caused to move to and fro in accordance with timing requirements.

It would, of course, not be possible to make this positive action close the valve and hold it closed without having a slightly elastic member secured between the cam

and the valve itself. For this purpose there is a small spring which is said to have a compressibility of about  $1/64$  in., and in closing the valve the roller pulls the rocker about this amount further after the valve is on its seat. This holds it down firmly, but the amount of movement is so slight that it does not delay the rapidity of opening, and the mechanism ought not to be liable to suffer from fatigue of any kind.

For each pair of inlets and each pair of exhausts only one cam groove is required, the way in which the rockers operate being shown in the photographs. It will be noticed that the camshaft lies in a trough, and this is kept filled with oil so that all the rocker mechanism is continually bathed with lubricant. Oil is supplied from the pump and can overflow, after reaching a certain level, at either end. The front end takes it down to the timing gears and the other returns straight to the sump.

The engine at present being made is a six-cylinder  $3\frac{1}{4}$  by  $4\frac{1}{2}$ , and uses the somewhat unusual four-bearing construction for the crankshaft, there being two balancing disks attached, as can be seen in one of the photographs. Crankshaft oiling is all under pressure, the shaft being drilled for the supply to the crankpins. For the pistons cast iron is used, and they are only  $3\frac{3}{4}$  in. long, carrying three Wasson rings. The pin is held in the connecting-rod turning in the piston.

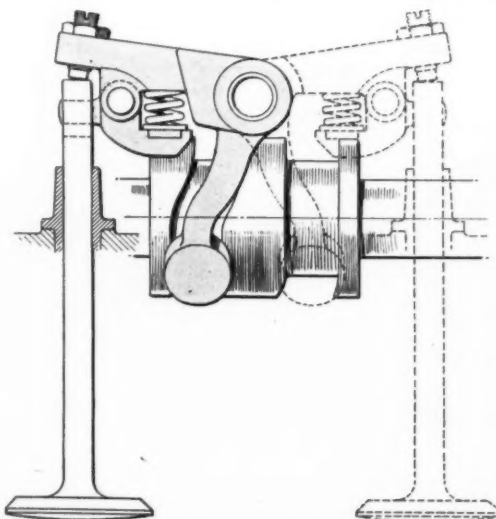
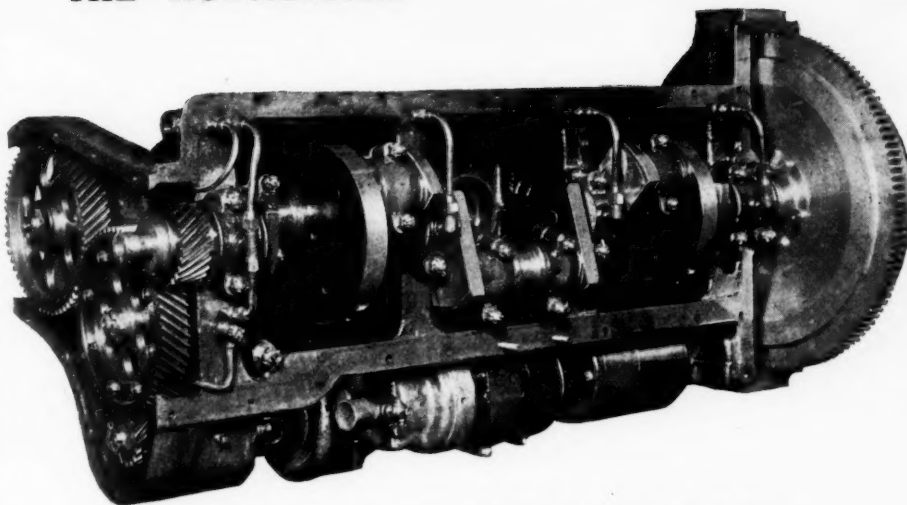


Diagram of Amalgamated valve operation showing the spring and trigger to insure firm seating



It is stated that the engine has been built with performance more in view than price, and that the best grades of materials have therefore been used. The 1½ in. valves are of Rich tungsten steel, connecting-rods are chrome nickel and the crankshaft is of a similar material. It is pointed out that the engine is not abnormally high, as is the case with some overhead valve designs, the actual dimension from center of crankshaft to top of valve cover being 21 in.

In the view taken from beneath it is seen that the layout of the oil piping is rather uncommon, the pressure feeds being taken to the caps of the bearings and the main channel, which is cast in the crankcase, is connected up by short pipes. This assists manufacture by enabling all the oilways to be cleaned out effectively before assembling the engine or during overhauling which is not



The crankshaft of the Amalgamated Six is balanced by two disks

usually possible when all the oil passages are concealed within the aluminum of the crankcase.

## Maxfer Makes New 1-Ton Truck

Worm-Driven Dependable Has Four-Cylinder Engine 3½ by 5—Sells for \$1,195 Equipped

CHICAGO, Feb. 7—A new 1-ton truck, the Dependable, has been brought out by the Maxfer Truck & Tractor Co. of this city. It has complete electrical equipment, worm drive, and a Bailey non-stall differential. The price for the truck including cab, curtains, windshield and standard platform body is \$1,195.

### Two-Unit Type Electric System

The power plant consists of a four-cylinder, four-cycle, water-cooled engine, with 3½-in. bore by 5-in. stroke, and develops full 30 hp. Lubrication is force feed by pump and splash. The starting and lighting system is a two-unit type with all wires carried in a conduit. The front headlights have dimmers and the vehicle is also equipped with an electric tail lamp.

The frame is 4 in. deep, heavily re-inforced by cross members and gusset plates. The springs front and rear are of the half-elliptic, no center bolt type. The rear springs are 3 in. wide and 51 in. long.

The front axle is a drop-forged I-beam with heavy steering knuckles and spindles. The rear axle has a David Brown worm drive with extra heavy axle housing requiring no truss rods.

### Brakes Are Large

The emergency brake is internal operating with a 13½-in. diameter and a 2½-in. face. The external contracting service brake has a 14-in. diameter and a 2½-in. face. Brake equalizers are provided on the rear axle.

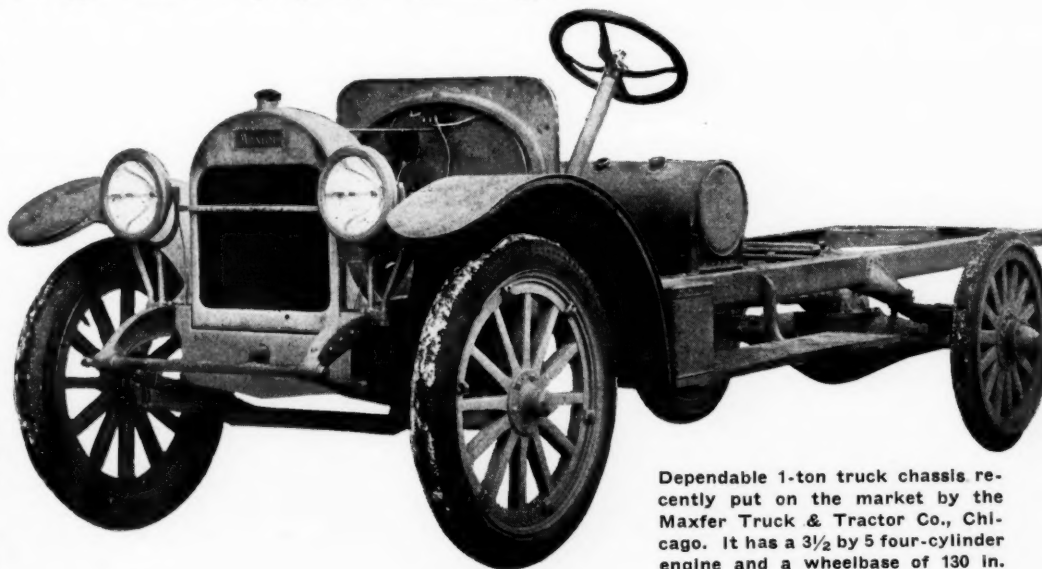
The front wheels are 34 by 4; pneumatics and

solids are carried on the rear of the same size. The chassis has a 130-in. wheelbase with a 56-in. tread. The loading space 6 ft. wide and from 9 to 11 ft. long, according to the body used.

The aim of the engineers was to build a heavy duty 1-ton truck, which will carry light loads at high speed and heavy loads without breaking down. The new truck was exhibited at Chicago in a special showroom directly opposite the Coliseum at 1512 Wabash Avenue. It is planned to turn out 2000 of these vehicles a year. The Maxfer company expects to turn out 28,000 of its truck units annually. One of its largest lines will be the converter for Fords, styled "Whale-for-Work."

### Quadrupling Factory Facilities

To meet this enlarged production plan the Chicago plant is being quadrupled in size, and in addition there is a plant at Martinsburg, Va.



Dependable 1-ton truck chassis recently put on the market by the Maxfer Truck & Tractor Co., Chicago. It has a 3½ by 5 four-cylinder engine and a wheelbase of 130 in.

# Foreign Trade Department

"Foreign Trade, like domestic trade, is essentially an exchange of commodities—If we wish to sell our goods abroad, we must in turn purchase from foreign producers" — Willard Straight.

By David Beecroft

PITTSBURGH, Pa., Feb. 7.—"To-day the American people are for the first time alive to the importance of foreign trade. They realize that foreign trade is essential to the welfare of the country. The tariff, therefore, whatever its local effect may be, is as it affects foreign trade, essentially a national issue."

In these words, Willard Straight, vice-president of the American International Corp., New York City, an organization formed to promote foreign trade, voiced what he considers the dominant thought in connection with foreign trade, as set forth in his address at the Fourth National Foreign Trade Convention held in this city a week ago. Mr. Straight dwelt especially on the necessity of the United States requiring a bargaining tariff, in order to meet the various tariff divisions that will be made by European countries at the close of the war as well as to meet changes these countries have already made.

## Cannot Meet Europe's Tariffs

At present our tariff is entirely barren of any bargaining feature in that it is not possible to raise import duties but only possible to lower them. To-day European nations are raising their tariffs but our country is powerless to meet these raises except through the slow and ponderous course of Congress. Mr. Straight contends that if the President were given the privilege of raising the tariff on different articles, or giving him the bargaining feature, it would then be possible to meet the different steps taken by Europe and do it quickly. He considers this a prime essential.

Mr. Straight gave some illuminating information with regard to our existing tariff. We quote briefly as follows:

"Under our present tariff 60 per cent of the articles imported into this country are imported free of duty. Ninety-five per cent of the value of imports from South America; with the exception of Cuba the same proportion of imports from Central America and West Indies; 90 per cent of the imports from Africa; 97 per cent of the imports from Oceania; and 70 per cent of the imports from Asia, now enter our ports without payment of duty."

Besides considering the bargaining tariff the prime essential for export trade Mr. Straight emphasized the fact that, while the United States may be the richest market in the world after the war, our manufacturers must not forget that international trade, like domestic trade, is essentially an exchange of commodities, and that if we wish to sell our merchandise in foreign lands we must in turn purchase from those countries.

We quote Mr. Straight on this subject as follows:

## Export Trade Not One-Sided

"The trend of economic policies in Europe is manifest. The need for maintaining our export trade is obvious. The United States will be the richest market in the world after

the war. The United States will be the most serious competitor which European industry will be obliged to meet in its campaign for recouping the losses of the present struggle. This war has demonstrated the fact which some of us in this country have heretofore been disposed to ignore—that international trade, like domestic trade, is essentially an exchange of commodities. We cannot hope that we shall continue to sell some \$3,000,000,000 more of goods than we buy. Commercial relationships to be permanent must be mutually advantageous. If we wish to sell our goods abroad, we must in turn purchase from foreign producers. Our purchasing power, therefore, is our first line of economic defense. To utilize it as such we must be able intelligently to regulate the importation into this country of goods which other nations desire to sell to us. By so doing, we may demonstrate the advantages which they may gain by purchasing articles which we in turn desire to export.

"We need a bargaining tariff. A bargaining tariff to be effective should be flexible. It should be possible to apply its provisions to meet situations as they arise. Our present tariff laws are inadequate from both points of view. Whatever be the underlying principle of the tariff it should possess adequate resources for the encouragement of our foreign trade and its protection from undue discrimination.

"It is not the purpose of this paper to enter into a general discussion of our tariff problems, to attempt to justify either a protective tariff or a tariff for revenue only. A general revenue bill may be based on one theory or the other. But whatever its underlying principle, a tariff law may be so framed that within certain specified limits fixed by Congress, the Executive may utilize the tariff either to secure concessions for American trade or to prevent discrimination against our products, or our interests in foreign lands."

## World's Tariffs Undergoing Revision

Mr. Straight contends that the entire tariff system of the world will be revised and is being revised at present. He contends that belligerents will have to increase their tariff duties to pay interest on the increased national debt, and that to obtain the necessary sums to care for these debts by fresh taxation will be to place an undue burden on capital and industry. He contends that fresh wealth must be created by the development of productive power and that such stimulative production must of necessity find an outlet in export trade. He carried this thought further by contending that although we have much of the gold, or a big portion of it, that this does not insure our international position in trade relations. That France and other belligerents will only buy from us as they require and that it will be necessary for us to make heavy purchases from them; in short, international trade in the future will as in the past continue to be an exchange of commodities.

We quote Mr. Straight further on this subject as follows:



"Although Great Britain has not as yet ostensibly departed from her traditional Free Trade policy, duties have been increased, charges have been imposed on articles hitherto admitted free, and the importation of others has been prohibited. These changes have been made to raise revenue, to curtail luxury and to give additional space on British ships for the transportation of necessities. But there has been a noticeable trend toward the idea of a tariff for protective purposes. It seems possible, therefore, that a tariff or economic partnership between the United Kingdom and the British colonies, and preferential arrangements between the British Empire and the Entente Allies, may be established. Similar arrangements may be made by the Central Powers.

"The three Scandinavian nations entered into a comprehensive trade agreement in July last. The difficulty of reconciling conflicting interests may make these combinations unworkable in their most extreme form, but the fact that they are contemplated is significant and must not be disregarded. We do not know what will happen, but whatever it is we should be prepared to meet it. For example, in order to secure the trade of South America, the United Kingdom may be willing to offer South American countries concessions impossible when the United Kingdom was a free market but feasible under a system of reciprocity which a British tariff would permit. Under possibly broader preferential arrangements between the Entente Allies or the Central Powers, South American countries may be able to obtain from them preferential rates in return for reciprocal advantages. Offers of this sort, coming from either Allied group, would be particularly attractive, because of long established trade relations, especially with England, Germany and Italy, and because of the large investment which these nations, and France, have made in South America.

#### We Must Protect Our Position

"If the European groupings, as a result of the war, are either collectively or individually to utilize bargaining tariffs as they have in the past, under their maximum and minimum, or general and conventional systems, it is essential that the United States should be in a position to protect its trade. The Entente Allies, for example, apparently contemplate post-bellum discrimination against the trade of the Central Powers. It has been stated that every effort would be made to continue close commercial relations with the neutral nations. Will the maintenance of such relations, however, be made contingent upon the willingness of neutrals to discriminate against German trade? The best method of avoiding such a dilemma is to realize that it may arise. If this or other equally difficult situations are possible, should we not now consider measures which will render them improbable?"

Mr. Straight believes that the warp and woof of our export trade is bound up with tariff questions and that it is as much a part of the manufacturers' work in developing foreign trade to consider our tariffs as it is to consider any other phase of increasing foreign trade. A prime consideration in this connection is that European tariff plan incorporating the "most-favored-nation" clause will perhaps be quite revised and that European countries may after the war go on the reciprocal basis, that is, extending to those countries favorable trade relations providing similar trade courtesies are returned. We quote Mr. Straight on this subject:

"Prior to the war, the commercial relations of the great trading nations were, though differing in detail, generally based upon the 'most-favored-nation' principle. The United Kingdom was the great free market.

#### Most-Favored-Nation Rights

"The British interpretation of 'most-favored-nation' treatment, under which a concession granted to one nation was *ipso facto* granted to all having 'most-favored-nation' rights, was generally accepted except by the United States. The American Government has always contended that, despite

'favored-nation' agreements, special reciprocal concessions imposed no obligation to extend their application to nations not granted similar advantages. Despite this conflict of practice, the United States has in effect enjoyed 'most-favored-nation' treatment from other great trading nations. These arrangements will inevitably be affected by the rupture of the inter-European agreements upon which our 'most-favored-nation' treatment was secured. The present indications are that Europe may abandon its former practice and adopt the American theory of reciprocal concessions. The United States, therefore, will be forced either to enter into preferential or reciprocity arrangements, or to threaten retaliation in case minimum rates are not extended to our products.

"By virtue of our ante-bellum arrangements, however, our after-the-war problem will not be to secure fresh concessions either from the nations of Europe or from neutral countries. It will be rather as far as possible to assure the reaffirmation of the old relationships with us, under the new systems which European nations may inaugurate among themselves. The American task will be to protect our exports from discrimination under preferential tariffs which may be adopted by the belligerent groups and under reciprocity arrangements which these groups may endeavor to negotiate with neutral nations. Such arrangements may deny to us 'favored-nation' treatment. This we can secure only by our ability to offer some concession or to threaten retaliation in case our products are discriminated against. To meet such a situation our Government must be able not only to act effectively but to act quickly.

"This requires the creation of adequate and flexible tariff machinery. Congressional action is necessary, but Congress, while it must determine the policy to be followed, is by its very organization slow to move. Senators and representatives have a multiplicity of duties and even the members of the Ways and Means Committee cannot give the constant and consecutive attention to the mere machinery of the tariff, which adequate preparation for the future would seem to require. If Congress, therefore, would adopt its policy and fix certain definite limits within which the Executive should be empowered to act, the difficulties inherent in the situation might be overcome.

#### Two Possible Tariff Adjustments

"To secure the desired result, two lines of action are open. Either the general schedules should be increased, in order that concessions thereunder may be offered, or the present schedules, with such changes as may now be made, should serve as a minimum tariff, and provision be made for a graded increase on certain articles to be selected with a view to the balancing of our export and our import trade. The former alternative is manifestly impracticable. Congress, and the country at large, would be reluctant to increase all duties and remove numerous articles from the free list with a view to later granting concessions thereunder. The possibility of concessions under reciprocity arrangements is calculated to create uncertainty in the minds of business men. The second plan, therefore, seems the most feasible. The precedent for such legislation has already been established under previous revenue bills. The suggested Senate amendment to the Underwood bill, with certain amplifications, vesting in the President the power to impose a surtax on certain selected articles, or a duty on certain articles ordinarily on the free list, would give both the power to prevent discrimination by the threat of retaliation, and the possibility for quick and effective action.

"The adoption of such legislation, the creation of the tariff commission, the co-ordination of the work of this commission with the Departments of State, Treasury and Commerce, would give us the machinery which is required. If the principle of a bargaining tariff is a sound one, the necessity for the adoption of this principle is immediate."

# Automobile Industry Is Best Organized in United States

Chamber Passes Resolutions Favoring Daylight Saving, Webb Bill and Co-operation Between Government Bureaus, Manufacturers and Business Men—Discusses Requirements for Foreign Trade and Education Needed

By Donald McLeod Lay

WASHINGTON, D. C., Feb. 2—The automobile industry is the best organized industry in the country. So Howard F. Coffin, member of the Naval Consulting Board and vice-president of the Hudson Motor Car Co., told the fifth annual meeting of the Chamber of Commerce of the United States, which closed its 3-day session here to-day. No more than 15 per cent of the factories could continue their regular work, said Mr. Coffin, in his address on National Defense, which was particularly pertinent and important in view of present international developments.

Close consideration and constructive discussion of many widely varying subjects relating to increased commercial, industrial and personal efficiency occupied practically the entire convention of the chamber with the exception of routine business.

Automobile, motor truck and parts and accessory manufacturers and engineers are vitally interested in subjects taken up by the meeting, as may be seen from a summary of some of the resolutions passed:

1—*Recommending that Congress enact legislation to move forward the clocks in all States 1 hr. for not less than 5 months each year.*

2—*Reiterating chamber's approval of the Webb bill permitting combinations for foreign trade, and requesting action on it at the present session of Congress.*

3—*Protesting against proposed method of imposing excess profit tax on corporations and co-partnerships.*

4—*Advocating closer relations between the various trade associations, the Federal Trade Commission and the government.*

5—*Urging the establishment of a supervising board of approximately five trained statisticians to direct the work of the census bureau to prevent overlapping and useless work and to insure practical presentation of useful and accurate figures.*

Other thoughts prominently brought out at the meeting were:

a—Importance of our growing foreign trade and necessity for education and preparation to meet the fierce competition that will follow the war.

b—Heightened commercial, industrial and personal efficiency to meet the new conditions.

c—Closer co-operation between government bureaus, business men and trade associations in both domestic and foreign trade.

d—Need for uniform bills of lading and uniform insurance policies to prevent fraud and to simplify handling.

e—Universal adoption of metric system of weights and measures throughout the United States.

f—Necessity for a bargaining tariff.

g—Discarding ad valorem system in tariff in favor of specific weight system.

h—Arbitration of trade disputes.

i—Need for a new commercial treaty with Russia.

j—Standardize costs through Department of Commerce.

k—Improve best existing methods in all industries.

There were 1282 delegates and guests in attendance at the meeting, as compared with approximately 960 last year. Most of the sessions were held in the auditorium of the New Willard Hotel but this afternoon's meeting was in the Pan-American Union.

## Should Move Clock Ahead 1 Hr. In Summer

Increased Efficiency, Lower Factory Costs and Healthier Workers Logical Results

SIMULTANEOUSLY with the holding of the Daylight Saving Convention in New York, the committee on daylight saving of the Chamber of Commerce of the United States reported its recommendation that Congress enact legislation providing for moving the clock ahead 1 hr. on April 1 each year and, if necessary, turning it back on Nov. 30.

Our hours are out of keeping with the hours of daylight, especially in summer, and the committee pointed out the folly and wastefulness of sleeping through hours of sunlight in the morning and then burning artificial light for several hours in the evening. These habits are probably the result of improved illuminants and changing industrial conditions. As an example of present conditions, the situation at Chicago was cited. Throughout the year at Chicago the time between sunrise and noon, the usual time of breaking the work-day, is longer than that between 1 p. m., when the second work period begins, and sunset. In December there are almost 5 hr. of sunlight before noon and less than 3½ hr. after 1 p. m. In June there are approximately 8 hr. before noon and about 6½ after 1 p. m.

Thus our workday deprives us of sunlight in a part of the day of great importance to human and consequently factory efficiency. It also interferes to a considerable extent with our business relations with Europe. Moving the clock ahead 1 hr. will substitute a cool morning working hour in summer



for a warm afternoon hour; in winter it may place breakfast before sunrise but will bring a greater amount of daylight into the working hours at the end of the day.

Increased daylight in the hours of greatest fatigue will lessen tuberculosis, reduce eye strain, increase personal efficiency and will materially lessen industrial accidents. Greater opportunities for education after work hours would be available and the entire social life of the nation would benefit. Furthermore there would be large direct savings in expenditures for artificial light, the latter an important factor to manufacturers.

Bills have already been introduced in the House and Senate and President Wilson has expressed his approval of the plan so that action during the present session of Congress is possible.

It is stated that Canada is only waiting for the United States to adopt the daylight saving plan before taking a similar step.

## U. S. A. Must Meet Europe's Increased Efficiency

### Intensive and Economical Production and Distribution Necessary in Foreign Trade

ONE of the most important committee reports was that on the Department of Commerce, which pointed out the marvelous increase in efficiency of European nations brought by war conditions as a prime factor in making these countries formidable rivals of the United States for the world's trade upon the cessation of hostilities.

The basic fact emphasized in the report is: "If we as American business men—individually and collectively—can produce and distribute with as little waste of materials, manpower and opportunity as our foreign competitors, we shall get on comfortably. If we do not, we must sooner or later suffer; for we shall be threatened and outdone in domestic markets as well as in those abroad. There is no escaping this basic issue. We may pile up wealth and gold reserves, establish scientific tariffs, negotiate the best of commercial treaties, carry on the most vigorous foreign trade propaganda, legalize combinations for exporting—we may do a hundred wise accessory things like these but unless they are backed up by a business fundamentally as efficient as that of our competitors they can give us no security."

### Europe's Labor Supply Ample

Europe has been fitting its factories with modern American automatic machinery for the quantity production of war munitions and this equipment can be equally effective for quantity output of peace products after the war. Workmen have been receiving practical scientific training and women have been introduced into industrial vocations to such an extent that the tremendous wastage of men killed and crippled in battle will not handicap these nations as the American public assumes. Practically all the women workers will continue to be at least a potential labor supply during the period of reconstruction and when the surviving three-quarters or even two-thirds of the armies are added the available supply of trained labor will be found larger than at the outbreak of the war. Moreover, the people of these countries have been schooled in self-sacrifice, their muscles have been hardened and their wits sharpened by the years of war and these things will stand them in good stead in the trade war to follow.

Co-operation, too, has made great strides in Europe. Business men work together, not against each other. Governments keep in close touch with business needs and supply them, whether for foreign or domestic trade. In England forty official committees of exports are now engaged in matters re-

lating to the maintenance of trade after the war. Similar committees are working in France, Germany and other countries.

With a view to offsetting the gains in business economy made by our competitors, the committee proposed the addition of four closely-related functions to the Department of Commerce:

1—To find out in detail what it costs to do business in the United States.

2—To deduce sets of reasonably attainable standards for the various items of expense in the various lines of business. This work, of course, would have to be done by easy stages as the facts became available.

3—To tell manufacturers and merchants how to attain the standards set.

4—To ascertain the best methods in use in each industry and to improve them.

The work should not stop here, however, as the most economical method of distribution in each case should be determined and other problems solved to strengthen our economic fabric.

### More Useful Statistics Needed, Committee Reports

The outstanding thought in the report of the Committee on Statistics and Standards was that business men need fewer statistics but of more vital import. Moreover, these should be as complete and accurate as possible and should be presented in such form that those for whom they are intended will really study and use them.

## 1 TO 2 YEARS REQUIRED TO PLACE INDUSTRY ON WAR BASIS

By Howard F. Coffin

Member Naval Consulting Board and vice-president and consulting engineer, Hudson Motor Car Co.

**T**HE automobile industry is the best organized industry in the country. After a declaration of war no more than 15 per cent of the industry would keep on with its regular work. All other industries would be affected in about the same proportion. Close observation of the experience in foreign countries has shown us the vital necessity for a prearrangement in all industries.

Wars as now waged involve every resource of a nation. Every factory, every man, woman and child is affected. Every sinew of transportation, industry and finance must be harnessed for the common good. It is upon organized industry in the United States that we must base any and all our plans for a military defense, and in the event of trouble with any of the first-class powers between 80 and 90 per cent of our industries would be centered upon the making of supplies for the government. From 1 to 2 years of time and effort are needed to permit any large manufacturing establishment to change over from its usual commercial peace-time work to the supplying of war materials. After 2 years of diligent work over 20,000 inventories are now on file in the Council of National Defense.

## Export Trade Is Now as Necessary as Domestic

Essential to Reserve on Which Home Credits Depend, Says Secretary Redfield

**EXPORT** trade is now as much of a necessity to the industries of the United States as domestic business, Secretary of Commerce Redfield told the Chamber in his address on Business Conditions. He pointed out that we are at the dawning of a new commercial era in which the role of the United States is far different from that formerly played. Industrial and commercial requirements are already changing and in the future co-operation and greater business efficiency will be necessary, while the wasteful methods at present in almost universal use in this country must give way to more intensive production. Export trade is essential to the preservation of the reserve on which our home credits depend.

Under the new conditions men of science must be welcomed into our factories, the metric system of weights and measures must be adopted and the work of the trade and technical association developed. Mr. Redfield approved particularly of the way in which the business trade associations are improving the scientific side of business by standard cost accounting systems, etc., and also of the elimination of individual selfishness in the work of these organizations.

### Foreign Trade Requirements

**ESSENTIALS** of foreign trade development in the opinion of the American Chamber of Commerce of Paris were stated by its delegate to the Chamber of Commerce of the United States, Mr. Shoninger, to comprise:

- 1—A bargaining tariff using specific (weight) system instead of the ad valorem;
- 2—More complete co-ordination of all industries;
- 3—Facilitation of banking arrangements;
- 4—Co-operation between manufacturer and exporter in establishing American selling agencies abroad;
- 5—Elimination of unnecessary intermediaries; and
- 6—Education of representatives for foreign trade work.

Mr. Shoninger pointed out that all European nations have discarded the ad valorem system in their tariffs in favor of the specific and called attention to the need for a bargaining tariff as brought out at the meeting of the Foreign Trade Council in Pittsburgh.

In discussing education for foreign trade as carried on in France, Mr. Shoninger mentioned schools covering this field which are aided by the French government though the greater part of the expense is borne by the chambers of commerce. Selected students from these schools sometimes are sent around the world to round out their education.

## Education for Foreign Trade Must Be Universal

Presents Methods Wrong for a Commercial Nation—Entire Population Must Learn

**EDUCATION** for Foreign Trade, an address by Wallace D. Simmons, president of the Simmons Hardware Co., St. Louis, emphasized the necessity for making such education a matter for the entire population of the country instead of only for a chosen few. It is a hopeful sign, Mr. Simmons said, that business men are turning to commercial, technical and industrial education as this is essential to the development of a permanent foreign trade.

Foreigners are being employed by our big business houses for export work only because there are no Americans qualified by education and experience to undertake it. Mr. Simmons advocated beginning in the primary and secondary schools more thorough teaching of arithmetic, commercial geography, including trade routes and products of the various countries, history and customs of other nations, etc. Under the present system Mr. Simmons considers that the elementary and fundamental subjects are neglected by pupils in their haste to attain more complex but less practical knowledge.

In the lively discussion following Mr. Simmons' address H. E. Miles, Racine, Wis., told of the big movement now going on in our shops and factories to increase the skill and earnings of workers which invariably results in larger profits. Automobile, engine and parts manufacturers are among the leaders in this work.

### Trade Museum for Paris—New Commercial Treaty with Russia Needed

**ESTABLISHMENT** of an American museum in Paris for developing trade between the United States and France, securing the benefit of a "most-favored-nation" clause in treaties with other countries and a new Russian-American commercial treaty were recommended in the report of the Committee on Foreign Relations.

An American trade museum in Paris would greatly benefit our commerce, it was stated, if the American Chamber of Commerce in Paris, for example, were to take the responsibility for conducting it. Such control would be necessary to insure against deterioration of the museum.

European nations after the war will favor their allies and restrict their enemies' trade. We must study these European agreements to safeguard our interests.

For the same reason the new treaty with Russia will have to wait till peace is declared. The committee recommended that, when the time to negotiate this treaty arrives, the State Department take advice of business men experienced in Russian trade. A committee of such men representing the Chamber has been available for 2 years.

### Arbitration in Trade with Argentina—Other Plans Under Way

**AFTER** reporting the successful completion of arrangements with the Bolsa de Comercio de Buenos Aires for arbitrating disputes affecting trade with Argentina, the Committee on International Commercial Arbitration stated that similar agreements are under way with the Comara de Comercio de Montevideo, for Uruguay, and urged action with the other Latin-American countries.

Practical arbitration in our trade with Argentina is especially opportune as complaints have come from that country that American exporters were not complying with their contracts and the Federal Trade Commission reports that in Latin America unfair competition against our goods and trade by European rivals frequently takes the form of calumny. Such conditions will be aggravated after the war and the arbitration plan will afford a means for adjusting well-founded complaints in accordance with their merits and by establishing and making known the facts will destroy all chance for successful calumny.

Under the plan all manufacturers and traders who put into their contracts the letters A. A. A. (American Argentinian Arbitration) can name their own arbitrators in case of disputes. Where parties fail to select their own arbitrators recourse is to the official lists of arbitrators. Proceedings occur under the supervision of a permanent committee which may intervene only in very extreme circumstances to avoid enhanced damages. If the losing party feels aggrieved



he will have opportunity to present his case to his trade or commercial organization, as the courts will not be invoked to enforce awards.

The association of the Chambers of Commerce of the United Kingdom is understood to be considering the feasibility of a similar arrangement for arbitrating disputes arising from British-Argentine trade.

### Capital and Labor Must Co-operate

**H**ARRY A. WHEELER of Chicago, first president of the Chamber, delivered an address on Industrial Relations Thursday evening in which he said that the conflict between capital has placed the United States in an unfavorable competitive position.

Organized labor, he said, must come under some form of public control and organized business has had its session of unwise operations with subsequent legislative correction.

After stating that organized labor's purpose is wholly selfish, Mr. Wheeler went on to say that an organization which is promoted in business cannot be denied nor discouraged in the field of labor and even the right to strike must be acknowledged until it encroaches upon the safety of the nation and the welfare of the people.

### Latin Americans Complain U. S. A. Exploits Opportunity Created by War

**A** FEELING is prevalent in Latin-American countries that U. S. A. manufacturers and business men are exploiting the temporary opportunity for large profits due to the war without laying foundations for a permanent export trade. This significant statement was made by Dr. Leo D. Rowe, secretary-general of the International High Commission, in his address concerning that body.

South American merchants are looking forward to the end of the war and the return to commerce with Europe as an emancipation from U. S. A. methods, said Dr. Rowe. These conditions he considers are largely due to the lack of experience of U. S. A. manufacturers and business men in foreign trade and to the difficulty in securing representatives and employees with the requisite training.

The International High Commission strives for uniform commercial laws, methods and strong financial facilities in all American countries; seeks reasonable regulations for commercial travelers and aims to eliminate taxes on such representatives. Uniform bills of lading and exchange are other ends in view, together with the possibility of international coins for all American countries.

Dr. Rowe censured the failure of U. S. A. manufacturers and exporters to study the tariff classifications of Latin-American countries with which they have dealings, as ignorance of these classifications prevents them from getting the best rates. A little time spent on such matters would be repaid many times over.

### Urge Uniform Bills of Lading

**T**O insure sound and uniform bills of lading, the committee on this subject recommended a central bureau which should receive copies of all export and import bills in United States foreign trade. For this purpose an agreement could be effected with the carriers transporting goods to send copies of bills to this bureau, thus preventing the practice of issuing accommodation bills in foreign ports, if such a practice exists, as well as furnishing a protection against forgery. Several glaring cases of forged bills of lading and accommodation frauds were mentioned, the perpetrators in each case having escaped punishment.

"The one great need in connection with the form of our bills of lading," says the committee's report, "and the form of our insurance policies is uniformity." If the forms of the bills of lading are uniform, the committee thinks, it then becomes merely a question of insurance, the only requisite being that there shall be no gaps between the bill of lading and the insurance policy.

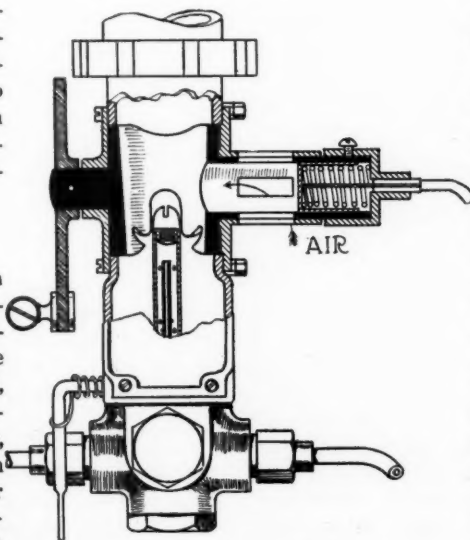
The committee recommended first, to make adequate provision against the circulation of forged bills; second, to make bills of lading and insurance policies uniform; and, when such uniform forms have been obtained, to make them permanent. This program involves a great deal of work and effort, but as the committee said: "It is worth while expending some effort to make safe the handling of five or more billions of dollars of bills of lading each year."

## Ferguson Air Control for Efficiency and Economy

**A** CARBURETER air control has recently been invented by Harry Ferguson of Belfast, Ireland, which is attachable to any carbureter. It is intended to supply additional air at such time when the engine requires it, while not interfering with any other carbureter function.

### Rich Gas for Starting

Ferguson's theory is that a rather rich gas is necessary for starting and running slowly, more particularly with modern gasoline. Similarly, a fairly dense mixture is desirable for maximum speed, but for ordinary running, from one-quarter to three-quarter throttle opening, a weaker mixture can be employed with advantage. To supply air in this way for the "middle half" of the throttle opening, Ferguson connects a tube to the throttle, which turns as the throttle lever is moved, opening ports



Claudel carburetor with Ferguson air device installed

to the air when the throttle is about one-quarter open, closing them again when it is about three-quarters open. In the illustration this is shown applied to a Claudel carburetor which has a barrel throttle, but it is equally applicable to any other kind. In the drawing the ports are shown open and within the tube there is a small piston backed by a coil spring. This is supposed to be connected to a cowlboard lever so that until the engine has warmed up the piston can be allowed to descend and cover the ports. As soon as the engine is warm the control is moved over to the open position and air is then admitted in accordance with throttle opening, as described above.

Emphasis is laid upon the fact that this cowlboard control requires no more manipulation than the ordinary choker fitted to every car and with which every automobilist is familiar.

# Car Owners and Dealers Need Education on Batteries

Service Problem Is Greatly Complicated By Their Ignorance on the Subject and Neglect of Proper Care in Everyday Use and When in Storage

**EDITOR'S NOTE:**—From a paper presented by J. Whyte, of the Prest-O-Lite Co., before the Indiana Automobile Service Managers' Assn.

**S**INCE automobilists now reach even the most remote corners of the country and insist on having their needs taken care of at all times, it becomes necessary that a battery service organization be of considerable magnitude. Almost any garage in any part of the country is able to give service on the mechanical parts of an automobile, but there is a deplorable lack of knowledge on the part of the average automobile mechanic as to the principles involved in the operation of a storage battery. This may not altogether be an unmixed blessing, because no knowledge at all is very considerably better than a little knowledge when applied to the possibility of tinkering with a storage battery.

This same point, however, complicates the conditions of building up a successful service organization in the storage battery field, because it renders the finding of experienced representation for a battery service station difficult. In the majority of cases, it is necessary to put these men through a course of training and educate them for this work before satisfactory service stations can be operated.

## Frequent Inspection Necessary

Prevailing conditions also further necessitate that frequent inspection be made in order that the service rendered be maintained at a high standard. The maintenance of a uniform grade of service is a comparatively simple matter for the direct branches of the manufacturer, but requires considerably more attention where service stations owned and operated by independent individuals are involved.

The use of the lead storage cell in the electrical industry, as a means of storing energy, is comparatively old, but the majority of its applications were confined to central station work or what might be described as semi-portable use. Under these conditions the batteries gave very satisfactory performance and fairly good efficiency. They were, of course, subjected to expert and careful attention and, by constant watchfulness, troubles by being anticipated were rendered infrequent. Batteries applied in this way also worked comfortably within their capacity.

The application of the storage battery to vehicle propulsion was the forerunner of the modern electric and here the battery was of reasonable size, the discharge rates were not excessively high, and the battery was taken care of as being a vital part of the machine.

## Growth of Battery Problem

With the application of the storage battery to starting duty in 1912, battery manufacturers were met with the problem of obtaining the maximum capacity from the minimum amount of weight and were also faced with the fact that their product was being turned into the hands of men who were accustomed more to handling mechanical devices than an electro-chemical unit which was sensitive to abuse and neglect.

In its application to starting and lighting work, the storage battery does not operate under the most favorable con-

ditions. It is subjected to heavy discharges and also in many cases to continuous overcharge for prolonged periods.

## Owners Neglect Battery

While the average automobile owner appreciates the fact that the entire mechanism of his car must receive constant care, attention and periodical adjustments in order that it may continue to give him satisfactory service at all times, there seems to be an unfortunate habit among owners to leave the entire electrical equipment of the car severely alone. The result of this is that if any irregularities should develop in the operation of either the starting motor or the generator, unless they are of such a serious nature that they put either unit out of business entirely, they are not given the attention they deserve.

Since the storage battery is the most sensitive unit in the entire electrical equipment, troubles which develop elsewhere usually show up first in their effect on the storage battery and are immediately diagnosed as battery trouble.

The wide variation of operating conditions also constitutes a difficult problem. Some owners on account of their vocation find it necessary to make repeated demands on the starting equipment, because it is necessary for them to stop and start frequently in the course of a day. Others are so situated that they use the starter infrequently and at the same time make long cross-country drives at considerable speed.

The conditions existing in the first case are such that there is every possibility that the amount of current drawn from the battery by frequent starting, will not be returned by the generator, since the amount of driving done between stops does not allow sufficient time for the generator to return the energy that has been withdrawn from the battery. If in addition any considerable amount of night driving is done, the entire situation is further aggravated.

In the second condition a very little current is drawn from the battery for starting purposes and a considerably larger amount of energy is returned to the battery than has been withdrawn for starting purposes.

On analyzing these conditions it is found that in the first case the battery slowly becomes discharged and finally reaches a point where it does not have enough energy to turn over the motor. This condition can be avoided by making frequent hydrometer readings of all the cells in the battery, and when the specific gravity shows that the battery is approaching a discharged condition, it should be removed from the car and charged from an outside source.

## Prolonging Battery Life

Taking precautions of this nature will considerably prolong the life of the battery and eliminate the possibility of it falling down, probably at a time when it is most required.

Too much attention cannot be paid by motor car makers to the matter of drawing the car owner's attention to the addition of distilled water. "Leave it alone" may be a good



doctrine for the rest of the system, but it spells ruin for the battery.

In some cases car makers place in a prominent position on a car a small name plate, advising the owner not to neglect his storage battery. On new cars again a good many makers tie a tag to the steering wheel bearing a notation which brings to the owner's notice immediately he receives the car, subject matter relating to the care of his storage battery and warning owners as to what may happen if they neglect to take the precautions that are outlined for their benefit.

#### **Ignorant of Battery's Existence**

It is scarcely believable, but nevertheless true, that there are a considerable number of automobile owners who do not even know where to find the battery on their car. The first time they realize its existence is when they try to use it and find it discharged. The car manufacturer and automobile dealer should take strenuous steps to correct this condition of things.

Every dealer should have in his possession a hydrometer and should educate his customers to its use and value, not only because it will help his customers, but also because it will ward off considerable annoyance to the dealer himself through the avoidance of battery troubles.

In spite of the continuous advice given in all literature on battery subjects to add nothing but distilled water to the battery, numerous cases are on record where owners will add anti-freeze to their battery during cold weather the same as they do to their radiators in ignorance of the fact that distilled water is the only thing that should ever be added to a battery, except by an expert battery man. Many dealers are no better posted, although our experience goes to show that most of them are willing to learn.

Examination of batteries from cars that are thus subjected to lack of care will usually show that they have never received any water and that the plates are absolutely dry, a condition usually resulting in the formation of injurious sulphate which in turn is very hard to break up and may necessitate an entire plate renewal.

If this same owner had attempted to use his motor without supplying it with the necessary lubricating oil, he would not have been at all surprised to have the motor burn up with him on the road; yet he is surprised that his storage battery should fail to perform its functions irrespective of whether it is cared for or not.

#### **Adjustment Is Required**

The close relation existing between starting and lighting units and the storage battery has already been mentioned, but the relation is important enough to justify further attention. One of the most prolific sources of battery trouble is that caused by irregularities outside of a battery itself. No mechanism can be expected to run indefinitely without adjustment. This applies not only to mechanical devices, but also covers electrical machinery and therefore the starting and lighting system of an automobile. Motors, generators, switches, regulators and wiring must be subjected from time to time to examination and possible troubles anticipated.

A regulator out of adjustment may cause too high or too low a charging rate with corresponding overcharge or undercharge of a battery.

Shorts in the wiring, switches or starting motor may allow a slow current leakage which will cause the battery to run down and become discharged.

At the same time owners should be encouraged to take their cars for inspection at frequent intervals to a battery service station. When on examination indications are found which would seem to point to the possibility of other parts or the electrical equipment being out of adjustment, the car

should be taken immediately to the dealer and the electrical equipment gone over carefully with the idea of avoiding possible irregularities that would lead to trouble.

#### **Coaching the Owner**

Some dealers send a letter to car owners the day following that on which the car is delivered, calling the attention of the owner to the existence of his storage battery and the necessity of adding distilled water and otherwise exercising a reasonable amount of care with this particular part of the car's mechanism. This is perhaps in a way a defensive measure on the part of the dealer, but is enormously helpful in getting the owner to take care of his battery and thereby derive the maximum satisfaction from his electrical equipment.

There is an unfortunate attitude exhibited by a great many owners when they do have battery trouble, irrespective of the cause, in which they seem to feel that it is no fault of their own, and in many cases they adopt the attitude of being held up for repair charges. As a matter of fact there is no group of men who have the interest of the automobile owner more at heart than the manufacturers of storage batteries. Further, their interest in the welfare of an owner's storage battery is sincere because they realize that the interest of the owner and the manufacturer are coincident.

#### **Education Is Needed**

They realize further, that as in the early days of the automobile industry, the owner had to be educated in the care of his car so in these days of storage batteries, the owner must be educated in how to care for his battery and its co-operative units in the electrical system. This educational work is being carried on on a large scale by storage battery manufacturers and at the expenditure of considerable sums of money. Battery makers are more than willing to bear their share of the expense involved in thus educating the automobile dealer and owner to a knowledge of how a storage battery operates, and the care and attention necessary for its welfare, because this is the vital necessity at the present time, in order to eliminate the majority of troubles at present experienced with batteries. They realize that the result of such educational work will be the better performance of the storage battery in its application to automobile work.

There is a condition which is at present causing grave concern to the makers of both automobiles and storage batteries and one which exists because of the perishable nature of a battery.

In these days of large production of cars, there exist periods when the available market for the disposal of cars does not equal the rate at which they are being produced.

This necessitates that cars be held in various quantities in different parts of the country over the winter months, in order to take care of the spring sales without any delay in deliveries.

#### **Storage Complicates Troubles**

If cars are shipped in the fall of the year equipped with storage batteries and these are held at the various sales points until spring without the batteries having been removed from the car and properly taken care of, the majority of these batteries are going to depreciate very rapidly as soon as they are placed in service.

This unfortunate condition is directly traceable to the very nature of the storage battery and creates a situation which may develop to be possibly unfair to the buyer of the car.

Every automobile dealer cannot reasonably be expected to install equipment and the necessary skilled labor in order to take care of the storage batteries over this period of time and in this condition we face one of the most serious problems

that has come up for some considerable time in order that we may render reasonably good service to the automobile owner.

#### Co-operation Is Necessary

This affords a problem that requires co-operative measures to be taken by both automobile makers and storage battery manufacturers, in order that some common ground may be reached whereby the owner of a new car is insured a battery in condition to give satisfactory performance. Under existing conditions the dealer should at least be cautioned by the car maker to see that the batteries on cars thus held over are charged approximately every 30 days, or that the batteries are removed from the cars and turned over by the automobile dealer to a competent battery service station for winter storage under proper conditions.

#### Educational Campaign Imperative

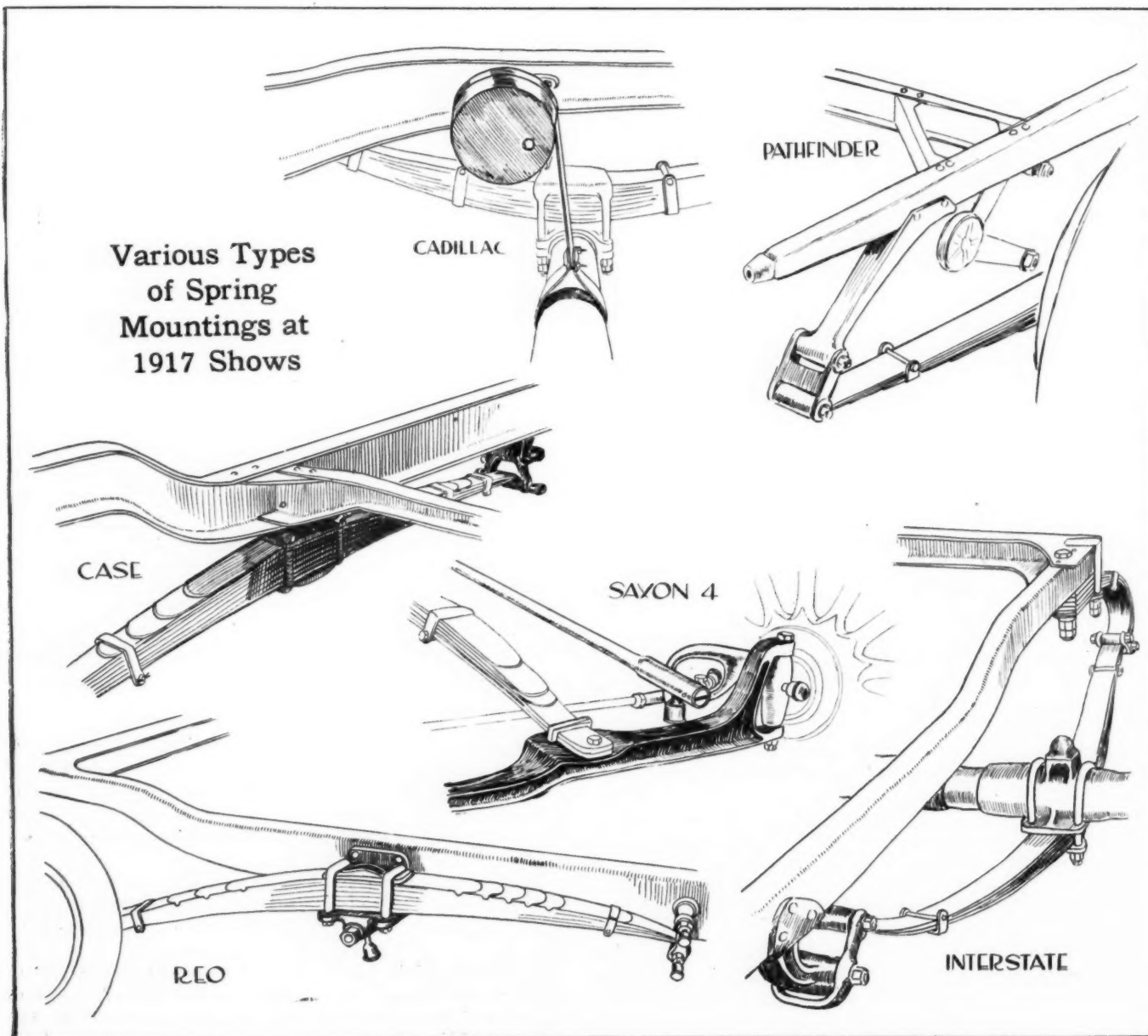
To sum up the entire situation the hardest work that is ahead of us at the present time is to conduct an enormous educational campaign, not only through the medium of advertising and distribution of literature, but also by soliciting the co-operation of the dealers and, where required, having first educated them, have them educate their owners to the

necessity of taking care of not only the storage battery, but also the units with which it must work in harmony.

This is the situation in which the automobile maker can help enormously, because while a progressive dealer is out for all the information he can obtain and undoubtedly pays considerable attention to literature received from parts makers it cannot be denied that information coming to him through the medium of the automobile manufacturers, whose product he may be handling, carries more weight than any information that he may receive from another source.

#### Problems of Entire Service Field

The problems that are facing the storage battery manufacturer in order that he may give efficient service are not his problems alone, but are of vital importance to everyone connected with the service end of the automobile industry and the present discussion and lively interest that is being taken in the subject are altogether encouraging to those whose duty it is to designate how the situation will be handled. It is to be hoped that the interchange of ideas in regard to this matter will result in at least the pointing out of a possible way toward the solution of the problems, which will be mutually acceptable to car manufacturers, dealers and owners and also to the storage battery manufacturers.







# The F O R U M



## Plain Tube Carbureter Satisfactory at All Speeds

By R. A. Leavell

*Assoc. Prof. of Mechanical Engineering, Iowa State College.*

ON page 1025 of THE AUTOMOBILE for Dec. 14, 1916, I note the following statement concerning the air valve type of carbureter:

"Included in the air valve types are the Zephyr, Air Friction, Browne, Branford, Breeze, Shain and K-D. Of these, alterations have been made during the year by Zephyr and Air Friction. The Branford, which at present is supplied only in the Ford size, will be made in all sizes after Jan. 1, 1917, without change in principle.

"The air valve carbureters are probably the most simple of all types. Either automatically or mechanically an auxiliary valve opens at higher speeds, decreasing the richness of the mixture to take care of the needs of increased speeds. Primarily, the auxiliary air valve is necessary to relieve the vacuum at the main jet caused by the increased velocity of the air current. As engine speeds increase beyond 1000 r.p.m. the auxiliary air valve becomes necessary, and it was from this type that the inspirations for the more complicated automatic devices were drawn."

It is the writer's experience that carbureters of the plain tube type with proper arrangement for compensation of the nozzle flow can be made to furnish a uniform quality of mixture with engine speeds even three or four times the limit which you place. A number of racing cars on the speedways last season were equipped with plain tube carbureters which seemed to give almost a uniform quality of mixture even at very high engine speeds.

Inspection of the quality of the exhaust issuing from an engine when it is being operated on a dynamometer test or probably better yet exhaust gas analysis can be made to show definitely that a plain tube carbureter properly designed can give a uniform quality of mixture up to the highest engine speeds which can be obtained with safety.

## Prefers Magneto

By J. O. Brouillet

BEING a most interested party as to which is the better, battery or magneto, for automobile ignition, I have closely followed the different articles and arguments that have appeared in the magazines and papers from time to time. And I see by a recent editorial in THE AUTOMOBILE you are of the opinion that this matter is to remain in the balance for some time to come. But through my business I have learned that the fact is that if this matter were put to a vote of the automobilists who had experience with both, the magneto would come out far ahead.

In the last 2 years, through my business, I have met not less than 5000 automobile owners who, having had experience with battery ignition, magneto, and battery again, all of them were well equipped to judge as to what is the best in that line. Without solicitation all of them have shown and expressed their displeasure with the battery, some in very strong terms.

Many who have the room, and whenever it is possible, are taking off the timers and putting on magnetos. One firm has changed over three. Others having several machines are do-

ing the same, and this is not saying anything of the large number of individuals who have come to see me in regard to changing over.

The salesman for one make of car who changed over from magneto to battery, in a talk with me and others was very frank; he said that his company was not doing it as an improvement, but for cheapness. Others closely allied to the automobile trade wanted to know what I had heard people say in regard to all these systems, as for themselves they preferred the magneto.

During one of the shows here, I stood by where a salesman was trying to sell a car of one of the prominent makes equipped with a battery system. He did not sell the car because the prospective buyer was an experienced man, and he wanted one with a magneto.

## Suggests a Vote

Now in view of the fact that the foregoing are all very much alive facts, gathered right from sources, and those most concerned, it proves quite conclusively what is best and wanted.

Why not put it to a vote, only those having experience with both systems being entitled to vote?

## Wire Wheel Patent Decision Affects England Only

By Milton Tibbetts

*Patent Counsel, Packard Motor Car Co.*

THE statement on page 199 of THE AUTOMOBILE for Jan. 25 relative to detachable wire wheels is not exactly correct. The report is dated from New York, but refers to a court decision relative to a British patent. It states that "any person is free to manufacture detachable wire wheels."

I think your statement should have been qualified to the extent that the decision in question affects the situation only in England and has nothing whatever to do with United States patents. It particularly has no effect on the Packard company's Cowles patent No. 1,103,567, application for which was filed in 1901, some years before the date of the British Napier patents referred to. This Cowles patent has claims broadly for detachable and interchangeable wheels, which is, of course, the way practically all wire wheels are made.

Perhaps your readers will be interested in this qualification to the statement published.

—Mr. Tibbetts is correct. The decision applies only to England.

## Using Fuel and Oil Mixed

By John W. Few, Jr.

THE following appears in the *Monthly Bulletin*, a magazine of one of the automobile clubs:

"For increasing the efficiency, taking out the knocks on hills and making what the builders call a 'sweet running engine,' add one pint of cylinder oil to every gallon of gasoline."

I know this was the way to lubricate two cycle engines but did not ever hear that it improved the run of four-cycle motors. Is there anything against the practice? Will you please discuss the subject in The Forum.

# Worm-Gear Theory and Practice

## Part III

*THIS is the third of a series of articles extracted from the paper recently delivered by F. W. Lanchester before the British Institution of Automobile Engineers. This paper is of such length that it practically amounts to a text book on the subject. While it deals particularly with the advantages of the Lanchester or Hindley type of gearing, the portions devoted to worm and wheel mounting are applicable to the parallel type of worm gear also. It will probably rank as a standard work of reference for years to come.*

THE experience of the Daimler Co., though dating from more recent time, is considerably wider than that of the Lanchester firm, inasmuch as the range of sizes and standards as defined by the different centers and ratios of gear is far greater; the applications range from the lighter types of passenger vehicles, both petrol and electric, to the heaviest type of motor truck, namely the 5-ton vehicle.

### Daimler-Lanchester Layout

The whole range of the Daimler-Lanchester worm gear standards is laid out diagrammatically to scale in Fig. 19. The different standards of blank are designated by the capital letters A, B, C, etc., in the order in which they were initially established. Types A, B, C, F and K have been produced for private pleasure cars, etc. Types D and L more particularly for electrical vehicles (supplied mainly to the U. S. A.). Types H, J, and O for commercial heavy vehicles, and type G for particular application to (stationary) power transmission.

Thus, in greater detail, type B, 6-in. or 152 mm. centers, is that used almost universally in full weight touring cars, limousines, etc. Type K, 137 mm. or 5 7/16-in. centers, for cars of, say 20 hp., weight not exceeding 3500 lb. gross. Type F, 120 mm. or 4 3/4-in. centers for cars of, say, 16 hp., not exceeding 3100 lb. gross.

The types H and J, 7 1/4-in. or 196 mm. centers, are for 3-ton trucks, but chassis and the like. Type O, 9-in. or 228 mm. centers, is for the heaviest road vehicle at present in ordinary commercial use, namely, the 5-ton truck.

A typical mounting for the A and B standards of gear is illustrated in Figs. 20 and 21. There is little to be noted

here except the self-adjusting spherical thrust bearings which prevent undue or unevenly distributed stresses on the thrust bearings as plausibly due to any slight "whip" or spring of the mounting or want of alinement. Contrary to the Lanchester Co.'s practice, also, it may be noted that the road wheel thrusts are taken independently of the differential box mounting.

Figs. 22 and 23 illustrated the mounting adopted in the 20 hp. Daimler chassis. In this mounting the worm is on top, and the worm box is cast integral with the main portion of the gear box. An interesting feature in this mounting is the fact that the thrust is placed adjacent to the worm itself, and the bearing is placed beyond. This inversion of the usual order results in a bigger bending moment on the worm shaft, but there is ample strength to carry this. The advantage lies in the fact that as designed there are, including the worm, only five parts in the mechanical circuit, if we regard the variation in ball diameter as negligible. These are the worm, the thrust half bush, the thrust live ring, the thrust fixed ring, and, finally, the gear box casting. Thus, the total variation in the location of the worm is the sum of five tolerances, or, as already expressed, there are five elements in the mechanical circuit. This may be considered a distinct advance in worm gear mounting as a step to securing interchangeability.

Figs. 24 and 25 show the G standard mounted as a fixed transmission—as such it has been applied for the driving of air compressors, etc., and other slow running plant from electric motors. It is good for 150 hp. at 1000 r.p.m. of the worm shaft.

It may be noted that the Daimler company's standard

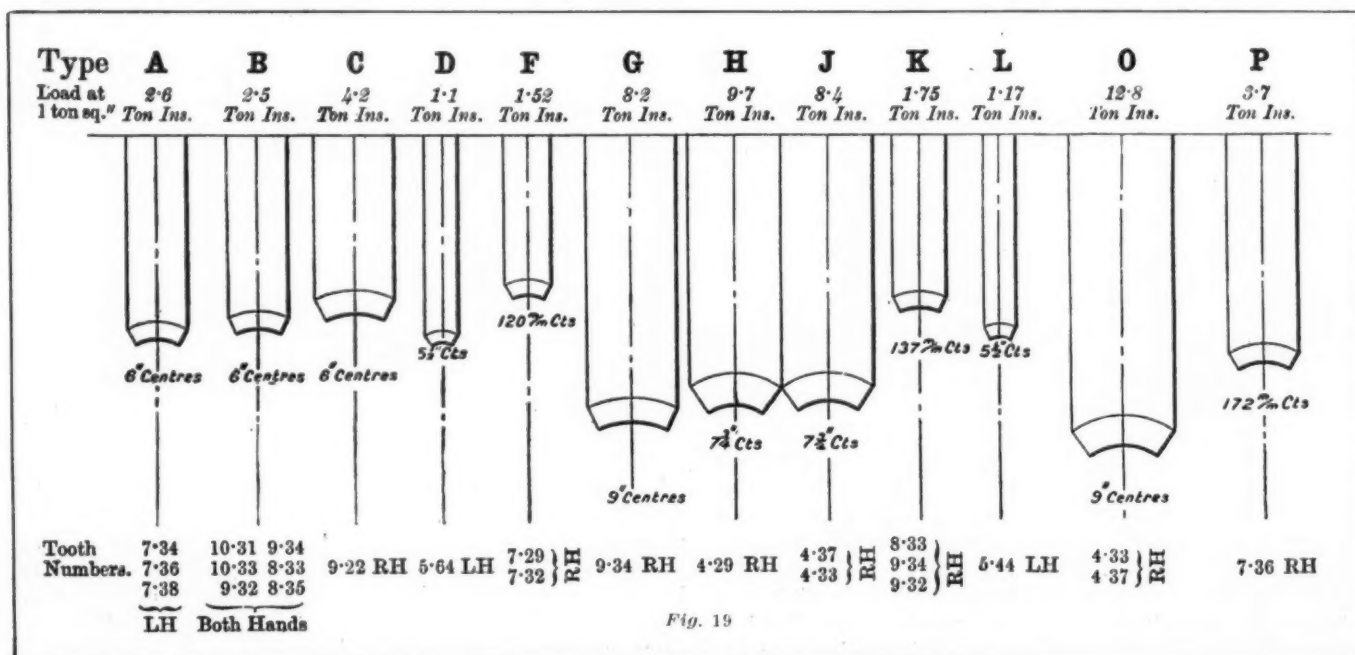
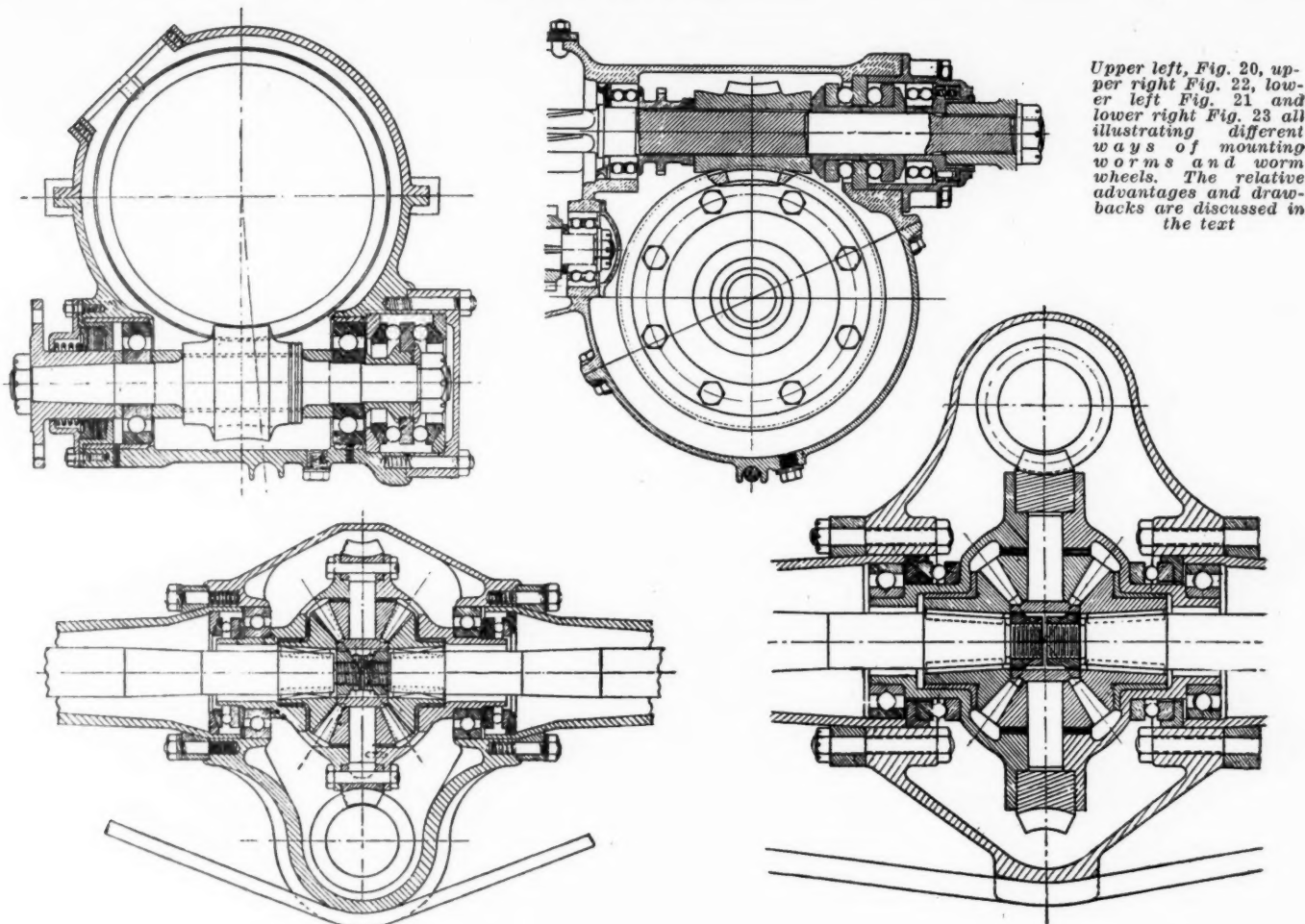


Fig. 19





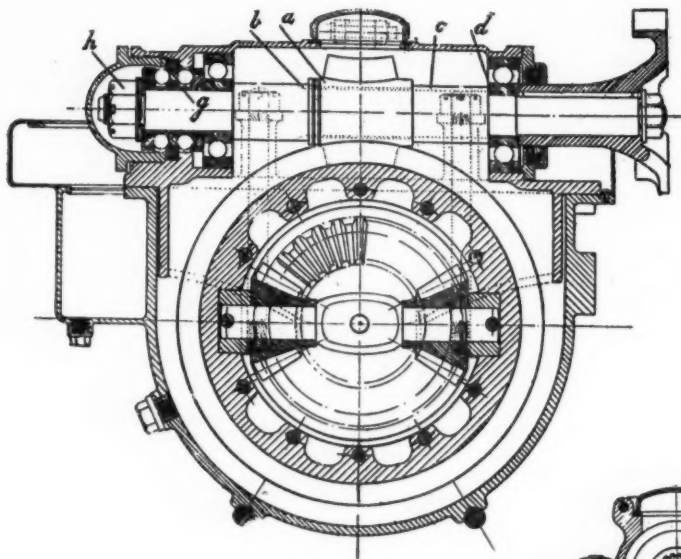
Upper left, Fig. 20, upper right Fig. 22, lower left Fig. 21 and lower right Fig. 23 all illustrating different ways of mounting worms and worm wheels. The relative advantages and drawbacks are discussed in the text

types for commercial vehicles (trucks, buses and the like) are of a heavier type, and, generally speaking, of considerably lower gear ratio than those for passenger vehicles, the difference being mainly due to the slower speeds commonly in demand and the larger diameter of the road wheels necessary for the duties in question, coupled with the fact that the engine speed is not proportionately lower.

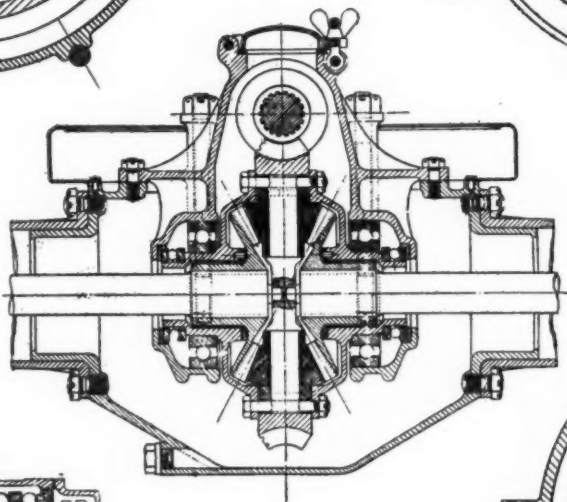
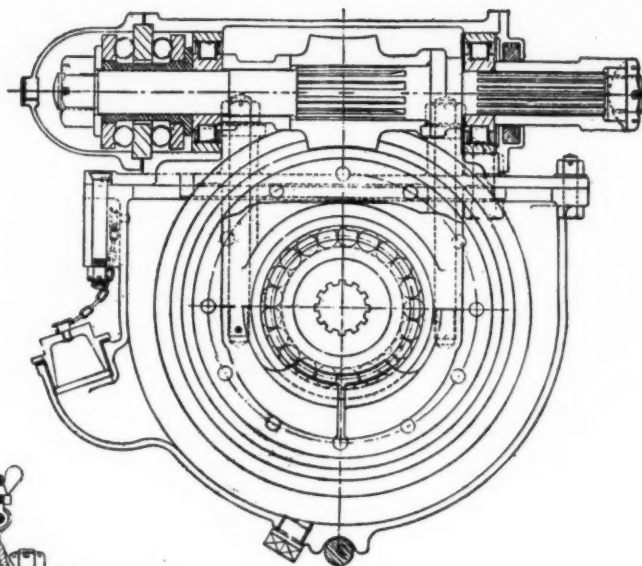
It may be said that in the application of worm gear to commercial vehicles the conditions are on the whole more exacting than in the touring car. The driving mechanism is rarely so refined, and the driver himself is not usually so fastidious. Beyond this, the loads are heavier, the tires less yielding, the suspension stiffer, and generally all the conditions which tend to "hustle" the gear exist in a more aggravated form. In consequence of this, it might be supposed that all the precautions which have been enumerated as tending to secure solidity of the worm shaft assemblage in the pleasure car will be at least as important in the heavy commercial vehicle; experience has fully justified this anticipation. It is absolutely necessary that the compression parts and thrust surfaces between the various components of the assemblage, namely, worm, spacing collar, roller race, thrust washer, etc., should be of ample area and on no account must they be left soft. As exemplifying points of good and bad design in this respect a comparison may be made between Figs. 26 and 27. In Fig. 26 a poor design of worm assemblage is illustrated, in which the defects are intentionally exaggerated; in Fig. 27 a design is given showing the proportions and precautions necessary to ensure success. Referring to Fig. 26, it will be seen that the thrust surfaces between the spacing pieces at *a*, *b*, *c*, *d*, etc., are of insufficient area. So far as concerns the taking of the necessary thrust reaction, they might with justice be regarded as more than ample; for example, at the point *d* the area of the contact faces is more than a

square inch, and may be taken as safe in compression for a force of 10 tons—the actual maximum load is not more than one-third and one-fourth of that amount. As a matter of experience, however, no such design will stand up, the faces in contact are found to undergo punishment and sooner or later backlash will develop, and the failure of the mounting follows in a very short time. The author has actually seen a case of this kind in which the one part has eaten into the other to the extent of some 3 or 4 mm. and the worm has had to adapt itself to an axial displacement of that magnitude; this can hardly be described as fair or proper treatment. When asked how to account for such failures taking place, considering the comparatively light thrust load per square inch carried by the faces in contact, it is fair to say that cases of even admittedly defective design do sometimes stand up; a certain percentage of output will not be reported as giving trouble. The truth probably is that the failure occurs through a little initial "slack" or backlash creeping in, either from careless mounting, due to insufficient initial pressure being put on by the retaining nut, or as consequent upon some slight defect in material or by bad or rough handling at some time or another. What has to be remembered is that a mounting which is not open to inspection (without virtually dismounting an axle) must be so designed and constructed as to be reliable even under the most unfavorable conditions; the need for large face contacts and hardened surfaces on which the author is insisting is thus based on experience of what *is* rather than on calculation as to what *might* or *should* be.

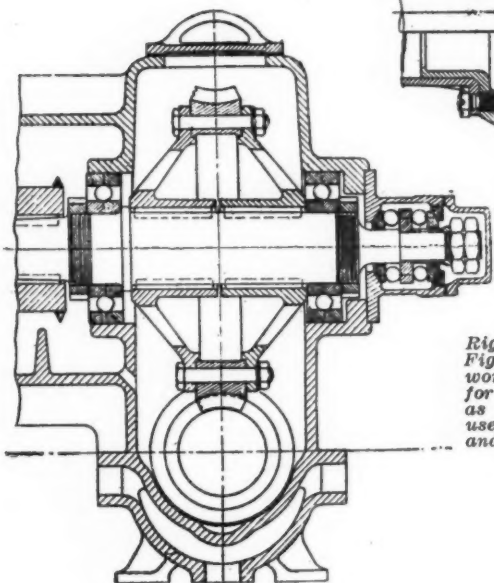
A further defect in the design shown in Fig. 26 is the thin distance tube *g* on which the double thrust bearing is mounted; it has been stated that the end nut *h* must be thoroughly tightened in order to secure the assemblage; if, as drawn, too much force were applied, the tubular spacing



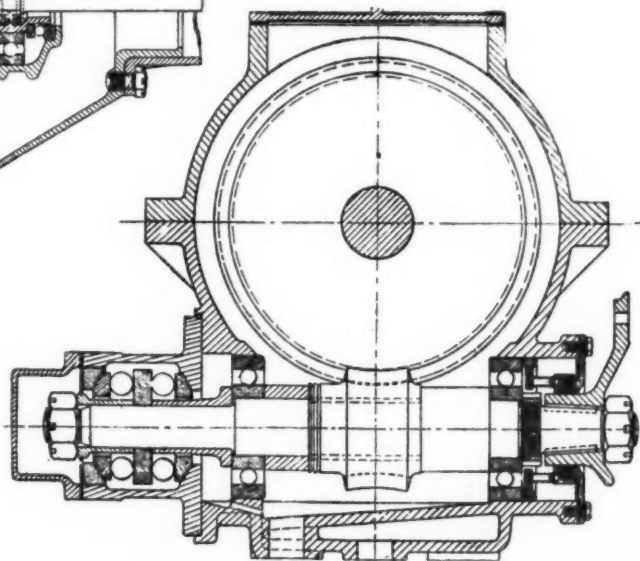
Above at Left—Fig. 26. Right—Fig. 27—The former shows a mounting which the author criticises severely and the latter a better design



Center—Fig. 28—A design of rear axle in which the worm is mounted on a very large number of very small splines



Right—Fig. 24. Left—Fig. 25—Sections of a worm gear assembly used for stationary work such as elevator service. It uses gear G of Fig. 19 and is good for 150 hp. at 1000 r.p.m.



piece would be liable to be crushed and unknown forces would be brought to bear on the thrust bearing itself, with the imminent risk of its failure—involving the usual undesirable consequences.

On referring to Fig. 27 it will be seen how much greater is the area of the faces provided, and generally what a far more secure job has been made of the worm location. Instead of the worm itself being held on one portion of a shaft and the thrust being held on another portion of the shaft, so that if either of two fixings come slack the worm develops backlash, we now see the worm and its thrust all held up solid on one section of the worm shaft, so that its location depends upon one fixing in place of two. Also the end face of the worm by which the brake thrust is taken is of increased diameter and bears direct on a face formed on the shaft itself.

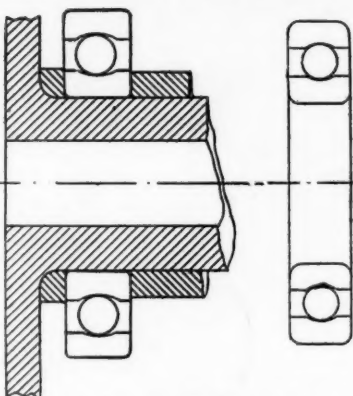
In Fig. 27, the system (to which reference has previously been made) of an accommodation piece is employed to overcome the difficulties of interchangeability, the piece in question, taking the form of a sleeve on which the double thrust is mounted; the accommodation piece is more precisely formed

by the flange of this sleeve, which constitutes a spacing piece between the roller bearing inner race and the first thrust washer, and its thickness is varied to correct for the combined inaccuracy of the width of the roller race and the thrust bearing dimension. It is, as before remarked, one of the troubles with which the constructor is faced that the makers of roller and ball bearings will not go to the trouble of working within decently fine limits; it has been reported that in the particular combination of roller and ball thrust given in Fig. 27 the variation between one sample and another is commonly (on an average) as much as 0.25 mm. Personally, the author is strongly in favor of dismantling all bearings as they come from the makers and rectifying their important dimensions so as to secure complete interchangeability; however, neither the Lanchester company nor the Daimler company has yet taken so drastic a course; the system of the accommodation piece has been taken as the simplest way out of the difficulty. No accommodation piece is wanted to correct for inexactitude on the part of the motor car manufacturer; this is evidenced from the fact that the present procedure is that the bearings are taken to the view



room and are "married" in sets, one roller bearing and one ball thrust, and the accommodation piece, the sleeve, is ground to whatever thickness is required in its flanged portion to bring the dimensions accurate between the points *g* and *h*; no similar pairing or grouping of parts is needed in the case of those for which the automobile manufacturer is responsible. It is quite clear from this that the attitude of the bearing manufacturer is quite preposterous, and we may look to his speedy reformation when the number of firms supplying ball and roller bearings have an output in excess of the demand; it is usually waste of time arguing with a man who has ready to his hand a bigger market than he can fill.

Another feature in which the makers of ball and roller bearings have much to learn before the goods in question cease to be a trouble to the designer is that of the *radius* which it is customary to put on the edges of the bearing races. This is too little, and results over and over again in a designer having to arrange an additional piece in his design in order to adapt the bearing to the shaft on which it is to be mounted. What is far more serious is that in many cases draughtsmen have been led to design shafts with comparatively sharp corners at collared portions in order to suit the bearing. It would be the best course mechanically to pass



Left—Fig. 29. Right—Fig. 30

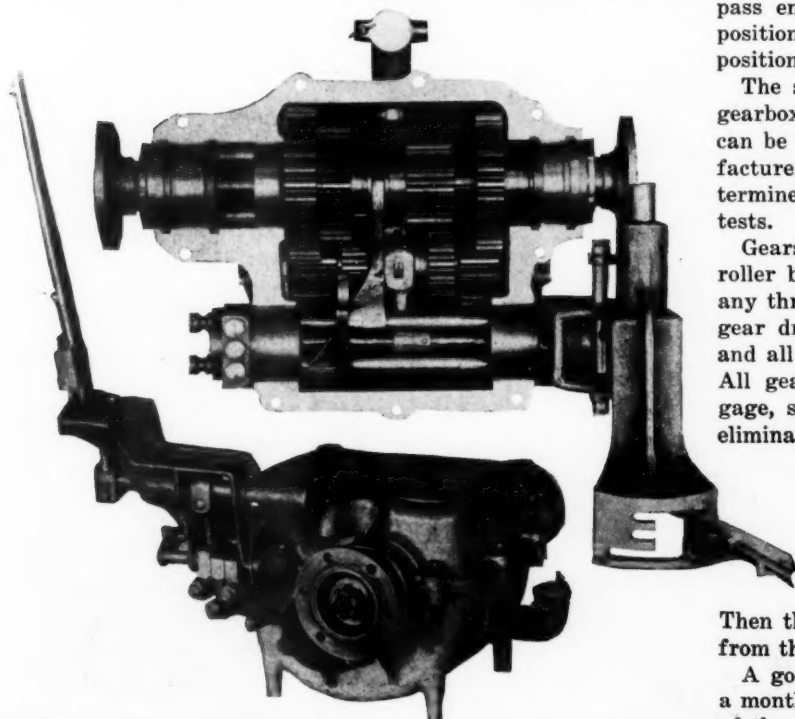
the bearings through an extra process and appropriately increase the radius to suit the needs of the shaft neck design, but there is always the danger that this might be neglected, especially in garage work where the bearing is, often enough, obtained direct from the manufacturer instead of through the car builder. This is one of the evils not so much felt in worm mountings (where more often than not the bearing is placed between two collars) as it is in other applications of the roller or ball bearing, but occasions frequently occur, and the point is one which merits attention.

In Fig. 29 we have a ball bearing as commonly turned out with its radius of only  $\frac{3}{32}$  in.; the shaft neck to take this bearing would have to be almost sharp in the corner. The figure shows this bearing accommodated by means of a collar or washer to a properly designed shaft neck. Fig. 30 illustrates what this bearing should be from the point of view of the automobile designer. The author fails to see any reason why a liberal radius as illustrated should not be adopted by the manufacturers of bearings. In fully interchangeable work any additional piece in the mechanical circuit, as in Fig. 29, means a fining of the limits of manufacture with an accompanying all-round increase in the cost of production.

## Cross Constant-Mesh Four-Speed Gearbox for Trucks

A NEW constant mesh four-speed gearbox especially intended for motor truck and bus chassis has been brought out by the Cross Gear & Engine Co., Detroit. The design is comparatively new in this country, although approximately 10,000 gearboxes of this type have been used in the service of two bus and taxicab companies in Europe.

The company claims that this gearbox is the shortest of its type, with four speeds in reverse and a capacity up to 5 tons. It was brought out in response to an increasing demand for four-speed gearsets with 1 to 1 ratio on high for trucks.



Cross four-speed constant mesh gearbox for commercial vehicles

The gear ratios employed are standard with European practice; that is, geometrical progression 1 to 1; 1 to 2; 1 to 3; 1 to 4 and 1 to  $4\frac{1}{2}$  on reverse. These ratios were adopted after a great deal of experiment by European manufacturers as most suitable for truck and bus work.

### Special Locking Device

The gearbox incorporates a special locking device which is claimed to be absolutely positive in action; two of the shifting fork shafts are held in position by locking pins which pass entirely through the shafts and hold them in neutral position while the third shaft is shifted into the required position.

The shifting lever is mounted directly on the case of the gearbox and is arranged for right-hand control, although this can be varied to suit the specifications of the chassis manufacturer. The pitch and width of face of gears has been determined after a great deal of experimentation and severe tests.

Gears and shafts are mounted entirely upon unusually large roller bearings, so that ample provision is made for taking any thrusts and radial loads set up by either chain or worm gear drive. The cases are made from direct steel castings and all parts such as shifting levers, forks, etc., are forged. All gears are renewable separately and made to accurate gage, so that one gear will interchange with another, thus eliminating the necessity of buying complete sets, a material advantage to the user.

### Easy to Disassemble

Ease of disassembly is a feature, as the gearbox can be taken down very quickly by unfastening the ten bolts securing the upper and lower cases together. Then the lower half containing all the gears can be removed from the car.

A good grade of heavy lubricating oil renewed about once a month is the lubrication recommended by the manufacturer of the gearbox.

# ACCESSORIES

## Boyce Moto-Meter for Overlands

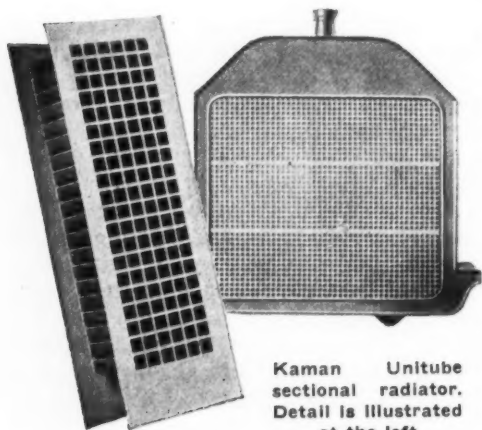
**T**HIS Moto-Meter is a model designed for the Overland car. It is only necessary to remove the screw which secures the radiator cap to the radiator and to enlarge the hole to  $\frac{1}{2}$  in. The construction is standard, with the exception of the stem, and will be part of the regular equipment of all 1917 Willys-Knight cars.—Moto-Meter Co., Inc., 148 West Fifty-second Street, New York.

## Ben Jack

This jack operates on ball bearings which support the weight at the base. It is actuated by turning a folding handle to the right or left. This handle locks to the receptacle on the jack, eliminating the necessity of reaching under the car in order to put the jack in position. The construction is such that a spiral screw engages with dogs on the lifting bar and operates by a gear with pinion. There is no reverse lever. To raise or lower the jack the rotation of the handle is reversed. All the working parts are enclosed in a solid, waterproof outer case and are packed in green. Price, \$6.—Wagner-Hoyt Electric Co., New York.

## Unitube Sectional Radiator

This radiator is built up from several sections, any one of which may be removed, repaired or replaced without interference. The elements are square brass tubes whose lengths are the thickness of the radiator, and which are joined at each end to a sheet metal header about  $\frac{1}{16}$  in. apart. The water circulates around the outside of the tubes; the air passing through the inner opening. A temporary repair may be effected by corking the ends of a defective tube, and a permanent repair may be made simply by replacing the tube. It is



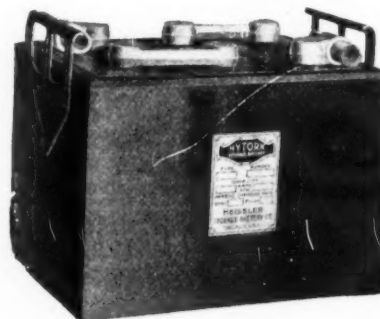
Kaman Unitube sectional radiator. Detail is illustrated at the left



Boyce Moto-Meter for Overland cars, showing method of mounting



Ben Jack, which operates on ball bearings supporting the weight at the base



Hytork starting and lighting storage battery

claimed that freezing has no harmful results, as the tubes are pressed inward instead of expanding and bursting. Price, Ford Special, \$30.—Unitube Auto Radiator Co., 1139 University Avenue, Rochester, N. Y.

## Hytork Storage Battery

The plates of this storage battery are designed and constructed for high efficiency and durability. The grids are made from an alloy of lead and antimony so proportioned as to produce a rigid and workable grid. After filling with the plate-composition, they are placed on an electrical charging board and given the positive or negative charge. It is claimed that the resulting plate may be bent until the grid breaks without disturbing the active material. Price, 6L-80, thirteen plates, \$27; 12-40, seven plates, \$34; 18-40, seven plates, \$44; 24-27, five plates, \$45.—Heissler Storage Battery Co., Chicago, Ill.

## P. B. B. Assembly for Fords

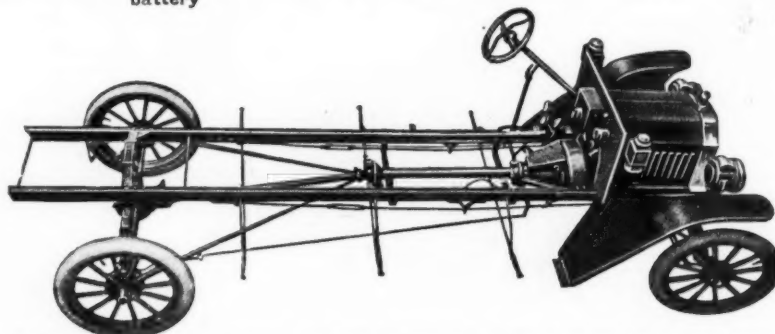
A Ford chassis may be extended to 124-, 130- or 136-in. wheelbase and converted into a 1200- or 1500lb. truck. The frame is extended by inserting two channel-iron extensions, the driveshaft is lengthened by means of a horizontal inclosed shaft provided with two universals, and all necessary parts for making the attachment are included in the equipment.—Greb Co., 196 State Street, Boston.

## Rapid Shine

Besides keeping the varnish of a car in an elastic condition and removing discolorations, this liquid preparation is claimed to leave a dry polished surface. Price, in gallon bottles, \$3;  $\frac{1}{2}$  gal., \$1; 12-oz. bottles, 50 cents.—Schroeter Bros. Hardware Co., 717 Washington Avenue, St. Louis.

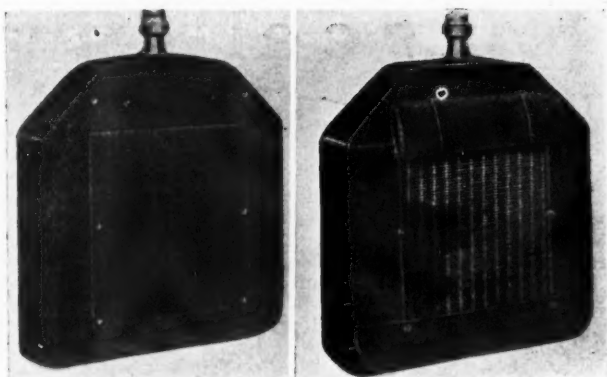
## Blitzen Rectifier

With this alternating-current rectifier a storage battery may be charged from the alternating-current lighting circuit, this feature rendering it suitable for use in small charging stations or in private garages. A solution, in a metal case, acts as a check valve to the electrical circuit, permitting current to pass in only one direction between the two elec-



P.B.B. assembly for extending Ford wheelbase to 124, 130 or 136 in., to form a 1-ton truck chassis





Gates radiator cover closed and open

trodes suspended in the solution. An auto-transformer, mounted at the top of the case, steps the lighting voltage down to the point required for storage-battery work. One 12-volt or two 6-volt batteries may be charged at 3 amp., or one 6-volt at 5 amp. on a 110-volt, 60-cycle line. Price, No. R1000, complete, \$17.50.—Clapp-Eastham Co., 139 Main Street, Cambridge, Mass.

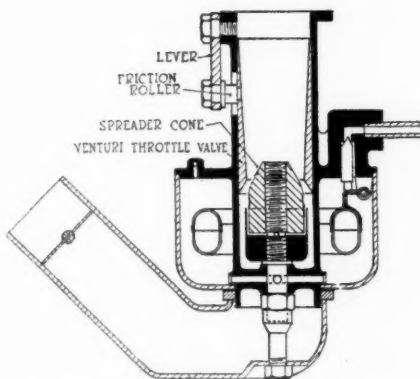
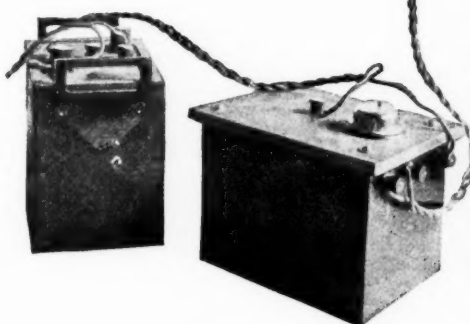
#### Weaver Universal Tire Changer

The removal and replacement of demountable rims is facilitated by this device. A heavy cast-iron base carries three adjustable arms that hold the tire and rim in a horizontal position at a height that is convenient. Straight-side or clincher tires are removed by the wedging action of a steel roller carried on a swinging arm, and are replaced by a set of rollers acting on the bead of the tire. Split rims are contracted or expanded by means of a screw-operated metal hook. Price, \$44.—Weaver Mfg. Co., Springfield, Ill.

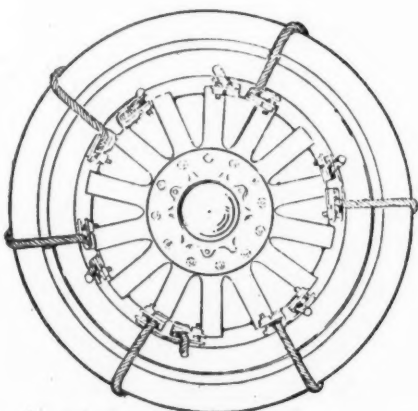
#### Justrite Carbureter

The Justrite is a single-adjustment carbureter in which the air is controlled by a sliding venturi throttle. The carbureter is characterized by the absence of springs and the common butterfly throttle valve, throttling being effected by the variations in opening of the gas passage due to the movement of a hollow tapered tube sliding over a conical

Storage batteries may be charged from an alternating current lighting circuit by the use of the Blitzen rectifier below.



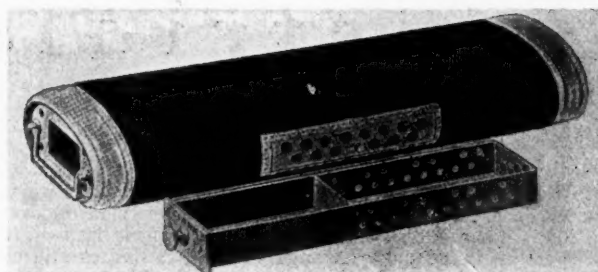
Justrite carbureter. Note the sliding venturi-throttle valve



Harrington traction producer



Weaver Universal Tire Changer



The Clark steel heater is a metal chamber in which is placed fuel in the form of compressed carbon bricks. It can be used in any kind of a car

plug. It is claimed that one adjustment of the spray nozzle is all that is required, and does not have to be changed for changes in altitude and temperature. Price, 1 in., \$20; 1 1/4 in., \$25.—Wilcke-Armstrong Co., 182 Beaubien Street, Detroit.

#### Gates Radiator Cover

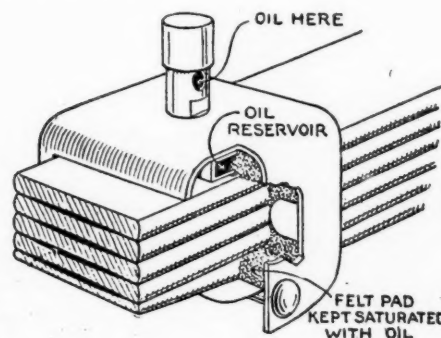
This radiator cover is made of Fabrikoid lined with heavy felt and is said to be easily attached, quickly opened and closed. Price, sample by parcel post, \$1.25. Hood cover, 90 cents extra. Radiator covers, per dozen, \$12. Hood covers, \$6 per dozen.—Gates Mfg. Co., Indianapolis.

#### Harrington's Traction Producer

This anti-skid device is designed for motor trucks. Each wheel set consists of six units; each unit being a seven strand steel cable locked onto the tire by means of a metal clamp. It is said that the cable is longer lived than a chain and effectively prevents skidding, and, being soft and flexible, cushions the shock on contact with the road.—Standley Skid Chain Co., Boone, Iowa.

#### Clark Steel Heater

Heat is supplied by the combustion of compressed carbon bricks. These bricks are held in a riveted steel body, lined with asbestos and covered with velvet plush. The body of the heater is 24 in. long and weighs 12 lb. One brick is said to furnish a steady heat for 12 to 16 hr., and may be purchased for 75 cents per dozen.—Price, No. 8XXX, \$10.—Chicago Flexible Shaft Co., LaSalle and Ontario Streets, Chicago.



Brown spring oiler showing application

# Industrial Miscellany

**Auto Body Co.**, Appleton, Wis., formed by D. H. Pierce and Gustave Seeger. Operations commenced. All types of bodies will be made for passenger cars and trucks.

**Fuller & Sons Mfg. Co.**, Kalamazoo, Mich., parts maker, will build a four-story addition, 60 by 176 ft., to cost \$150,000.

**Universal Four Cycle Motor Co.**, Muskegon Heights, Mich., has bought a site and will build a plant.

**Torbensen Axle Co.**, Cleveland, will build a machine shop addition of about 30,000 sq. ft. Contract has been awarded.

**Gray Motor Truck Co.**, Gary, Ind., is asking bids on an assembling plant, 110 by 120 ft., to cost \$9,000.

**East Palestine Rubber Co.**, East Palestine, Ohio, has prepared plans for the first unit of its new plant, 200 by 400, and a power plant, 90 by 100 ft.

**A. Z. Metal Works**, Thiensville, Wis.,

which lost its plant by fire recently, has resumed operations in a new factory. It specializes in motor truck and tractor radiators and cooling systems.

**Cleveland Motor Plow Co.**, Cleveland, which recently erected a plant for the manufacture of motor plows, has placed contracts for an additional building, 60 by 300 ft.

**Bates & Edmonds Motor Co.**, Lansing, Mich., maker of a special oil-burning engine and standard gasoline engine, is completing an addition which will double the capacity of the plant.

**Sioux City Tire & Mfg. Co.**, Sioux City, Ia., will build a plant, 80 by 130 ft., two stories, with boiler-room ell 30 by 52 ft.

**Beaver State Motor Car Co.**, Gresham, Ore., will soon complete its malleable-iron foundry.

**J. P. Gordon Co.**, Columbus, Ohio, has made a carload shipment of Ford seat

covers and tire covers for all makes of cars. It is also making two other carload stock shipments.

**Blue Ribbon Body Co.**, Bridgeport, Conn., formed to build automobile bodies. Capital is \$500,000. Incorporators are E. A. Godfrey, J. J. Godfrey and G. H. Woods.

**Smith Motor Truck Corp.**, Chicago, has broken ground for the second new plant. Building is expected to be finished by May 1. Company is planning to produce 50,000 Smith Form-A trucks during the coming year.

**Auto Specialty Co.**, St. Joseph, Mich., recently moved here from Joliet, Ill., will commence production.

**Gile Tractor Co.**, Ludington, Mich., has doubled its force and is employing more than 180 men.

**Ford Motor Co.**, Detroit, will erect a steel frame building there in addition to its present plant at a cost of \$265,432.

## The Automobile Calendar

### ASSOCIATIONS

Feb. 13-14—St. Joseph, Mo., National Annual Convention  
Pikes Peak Ocean to Ocean Highway Assn.

### CONTESTS

1917

April—Los Angeles to Salt Lake City Road Race.  
May 19—New York Metropolitan Race on Sheepshead Bay Speedway.  
May 30—Indianapolis Speedway Race, Championship.  
June 9—Chicago, Ill., Speedway Race, Championship.  
June 23—Cincinnati, Ohio, Speedway Race.  
July 4—Omaha, Neb., Speedway Race, Championship.  
July 4—Tacoma, Wash., Speedway Race, Championship.  
July 14—Des Moines, Iowa, Speedway Race, Championship.  
Aug. 4—Kansas City Speedway Race.  
Sept. 3—Cincinnati, Ohio, Speedway Race, Championship.  
Sept. 15—Providence, R. I., Speedway Race, Championship.  
Sept. 29—New York, Speedway Race, Championship.  
Oct. 6—Kansas City Speedway Race.  
Oct. 13—Chicago, Speedway Race.  
Oct. 27—New York Speedway Race.

### SHOWS

Feb. 3-10—Minneapolis, Minn., Show, Minneapolis Automobile Trade Assn.  
Feb. 5-9—Boston, 8th National Good Roads Show, Mechanics' Bldg.  
Feb. 5-10—Indianapolis, E. W. Steinhart Bldg., Indianapolis Automobile Trade Assn.  
Feb. 5-10—Bangor, Me., Bangor Automobile Assn., Auditorium.  
Feb. 5-10—Indianapolis, Ind., Indianapolis Automobile Trade Assn., Steinhart Bldg.  
Feb. 7-9—Washington, Pa., Washington Automobile Dealers' Assn., Washington Amusement Co. Rink, C. B. McAllister, Sec.

Feb. 7-10—Bay City, Mich., Automobile and Accessories, Armory, F. D. Shaver, Mgr.

Feb. 7-11—Kalamazoo, Mich., State Armory, Kalamazoo Automobile Dealers' Assn.

Feb. 8-15—First Pan-American Aeronautic Exposition, New York City; Aero Club of America, American Society of Aeronautic Engineers, Pan-American Aeronautic Federations.

Feb. 10-17—Harrisburg, Pa., Harrisburg Automobile Dealers' Assn., J. Clyde Myton, Mgr.

Feb. 10-17—Hartford, Conn., Show, State Armory, First Infantry.

Feb. 10-18—San Francisco, Cal., Pacific Automobile Show, G. A. Wahlgreen, Mgr.

Feb. 12-17—Bay City, Mich., Show, Armory.

Feb. 12-17—Kansas City, Mo., Second Annual Tractor Show, Union Station Plaza.

Feb. 12-17—Kansas City, Mo., Kansas City M. C. Dealers' Assn.

Feb. 12-17—Louisville, Ky., Show, First Regiment Armory, Louisville Automobile Dealers' Assn.

Feb. 12-17—Toledo, O., V. G. Kibby, 1017 Jefferson Ave.

Feb. 12-19—Indianapolis, Ind., Show, Steinhart Bldg., Indianapolis Automobile Trade Assn.

Feb. 13-15—Grand Forks, N. D., Auditorium, Automobile Dealers' Assn.

Feb. 13-17—Williamsport, Pa., Armory, John Kelly, Mgr.

Feb. 14-17—Peoria, Ill., Coliseum, Automobile and Accessory Dealers' Assn.

Feb. 15-17—Racine, Wis., Chas. A. Myers, Mgr.

Feb. 17-24—Albany, N. Y., Sixth Annual, State Armory, Albany Automobile Dealers' Assn.

Feb. 18-25—St. Louis, Mo., Show, Automobile Manufacturers' and Dealers' Assn.

Feb. 19-24—Springfield, Ohio, Show, Memorial Hall, Springfield Automobile Trade Assn.

Feb. 19—Pittsfield, Mass., Show, Armory, J. J. Callahan, Mgr.

Feb. 19-24—Portland, Me., Exposition Building.

Feb. 19-24—Grand Rapids, Mich., Show, Automobile Business Assn. of Grand Rapids.

Feb. 19-24—Duluth, Minn., Show, Duluth Auto Dealers' Assn., Armory.

Feb. 19-24—South Bethlehem, Pa., Show, Coliseum.

Feb. 19-24—Bridgeport, Conn., Show, Armory, Coast Artillery Corps.

Feb. 19-24—St. Louis, Overland Bldg., St. Louis, Auto Dealers' Assn.

Feb. 19-24—Syracuse, N. Y., Show, State Armory, Syracuse Dealers' Assn.

Feb. 19-24—Pittsfield, Mass., J. J. Callahan, Mgr.

Feb. 20-24—Salt Lake City, Utah, Inter-Mountain Automobile Show, Bonneville Pavilion, W. D. Rishel, Mgr.

Feb. 21-24—New London, Conn., Armory.

Feb. 21-24—Flint, Mich., Coliseum, Lake Side Park, E. W. Jeffers, Mgr.

Feb. 21-24—Trenton, N. J., Armory, Trenton Automobile Trade Assn.

Feb. 24-Mar. 3—Newark, N. J., Show, First Regiment Armory.

Feb. 24—March 3—Brooklyn, Show, 23rd Regiment Armory.

Feb. 24—March 3—Atlanta, Ga., Automobile Dealers' Assn., Auditorium.

Feb. 26—March 3—Great Falls, Mont.

Feb. 26—March 3—Omaha, Neb., Show, Auditorium, Omaha Automobile Show Assn.

Feb. 26—March 3—Utica, N. Y., Utica Automobile Dealers' Assn., State Armory.

Feb. 26—March 3—Wilkes-Barre, Pa., Hugh B. Andrews, Mgr.

Feb. 27—March 4—Atlanta, Ga., Show, Auditorium, Atlanta Auto Trades and Accessory Assn.

March 1, 2, 3—Urbana, Ill., Show, Automobile Trade Assn. of Champaign Co., Armory of the University of Ill.

March 3-10—Boston, Mass., Show, Mechanics' Bldg., Boston Automobile Dealers' Assn.

March 3-10—Washington, D. C., Middle Atlantic Motor Assn., Inc., Union Bldg.

March 5-10—Jamestown, N. Y., Jamestown Automobile Dealers' Assn., Armory, C. A. Hanvey, Mgr.

March 5-12—Birmingham Ala., Auditorium.

March 6-9—Fargo, N. D., A. Hanson, Mgr.

March 6-10—Fort Dodge, Iowa, Northern Iowa Show, New Terminal Warehouse, G. W. Tremaine, Secretary.

March 7-10—St. Joseph, Mo., Auditorium, St. Joseph Automobile Show Assn.

March 12-17—Vancouver, B. C., British Columbia Automobile Assn., Horse Show Bldg.

March 13-16—Fargo, N. D., Armory and Auditorium.

March 14-17—Mason City, Ia., Armory, Mason City Automobile Dealers.

March 14-17—Davenport, Iowa, Show, Coliseum Bldg., Tri-City Auto. Trade.

March 17-21—Manitowoc, Wis., F. C. Borchardt, Jr., Mgr.

March 17-22—New Haven, Conn., Show, Hotel Taft.

March 17-24—Pittsburgh, Pa., Motor Square Garden, J. J. Bell, Mgr.

March 18-23—Cedar Rapids, Ia., Cedar Rapids Automobile Trades Assn.

March 19—Paterson, N. J., Sixth Annual, Auditorium, R. A. Mitchell, Mgr.

March 21—Trenton, N. J., Second Regiment Armory, J. L. Brock, Mgr.

March 27-31—Deadwood, S. D., Fifth Annual, Deadwood Auto Show, J. E. Nelson, Mgr.

March 31-Apr. 14—Atlantic City, Garden Pier, S. W. Megill, Mgr.

April—Calumet, Mich., Show, Coliseum, Frank Ketchell, Mgr.

Apr. 4-7—Stockton, Cal., Second Annual San Joaquin Auto Trades Assn., Samuel S. Cohn, Mgr.

Sept. 2-9—Spokane, Wash., Interstate Fair.